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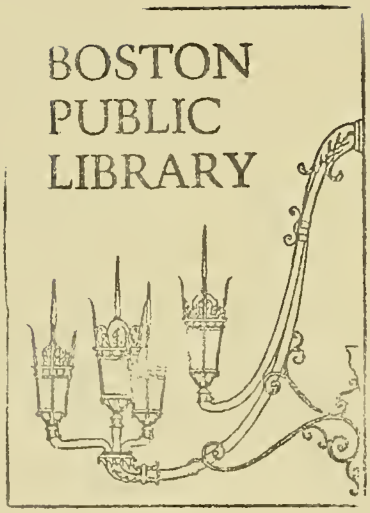

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PHASE III

AN ADVANCED TOPICS PROGRAM

THE FINANCIAL DISTRICT

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AN ADVANCED TOPICS PROGRAM

THE FINANCIAL DISTRICT

BOSTON REDEVELOPMENT AUTHORITY
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WILLIAM R. MCGRATH, COMMISSIONER

JOSEPHY GALEOTA, TRAFFIC ENGINEERING DIRECTOR

APRIL, 1970

TABLE OF CONTENTS

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LETTER OF TRANSMITTAL

ACKNOWLEDGMENTS

SUMMARY OF FINDINGS

I. INTRODUCTION AND BACKGROUND

A. TOPICS Program. 1

B. Purpose 1

C. Study Area. 2

D. Data Collection 3

II. TRAFFIC CONDITIONS

A. Analysis Methodology. 4

B. Parking Regulations 7

III. PROPOSED SIGNALIZATION PROJECT

A. Signal System 7

B. Parking Execution 14

IV. COSTS 15

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CITY OF BOSTON

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TRAFFIC AND PARKING DEPARTMENT

ONE CITY HALL SQUARE
BOSTON, MASSACHUSETTS 02201
722-4100

WILLIAM R. McGRATH
Commissioner

WILLIAM T. NOONAN
Deputy Commissioner

JOSEPH M. GALEOTA
Traffic Engineering Director

April 15, 1970

Edward J. Ribbs, Commissioner
Massachusetts Department of Public Works
100 Nashua Street
Boston, Massachusetts

Dear Commissioner Ribbs:

The attached report presents a detailed study and plan for traffic operations improvements in a portion of Boston's downtown core area. The report has been prepared both as a technical definition of operational needs in the Financial District and as an application for TOPICS funds to implement a major portion of the plan. The proposal which constitutes an advanced TOPICS project has been carefully reviewed in the light of Boston's overall development scheme to ensure that major alterations would not be necessary in the future.

Implementation of the project as outlined would significantly improve the efficiency, orderliness and safety of vehicular and pedestrian traffic in Boston's Financial District. In anticipation of the availability of Federal and State funds to support the project, the engineering staff is proceeding with final plans and specifications. Upon approval by your department and the Bureau of Public Roads, implementation could begin immediately.

Very truly yours,

William R. McGrath
Traffic Commissioner

WRM:jcg

ACKNOWLEDGMENTS

This report represents the combined efforts of several consultants and the staff of the Traffic and Parking Department. Motor vehicle and pedestrian count data was collected by Planning, Engineering and Development, Inc. of Hingham, Massachusetts. Preliminary signal designs, layouts and cost estimates were the responsibility of the staff. Fay, Spofford and Thorndike, Inc. of Boston have prepared typical design and cost estimates for the structural problems encountered.

Murray D. Segal, Transportation Consultant of Brookline, Massachusetts, assisted in the preparation of this report.

SUMMARY OF FINDINGS

1. Traffic signals are needed at 14 intersections to reduce accidents, aid pedestrians and regulate traffic flow.

2. Curb parking allocation should be revised to increase the efficiency of space utilization and to expedite traffic flow, especially at rush hours.

3. Parking regulations should be revised to protect the investment in signals. In particular "NO STANDING" zones should be used during critical periods.

4. The new towing program now being implemented should include the Financial District (NO STANDING zones).

I. INTRODUCTION AND BACKGROUND

A. TOPICS Program

This report outlines an advanced project to be considered under the TOPICS Program. The TOPICS Program (Traffic Operation Program to Increase Capacity and Safety) is administered by the U.S. Bureau of Public Roads and is intended to maximize the efficiency of existing urban street systems (as opposed to major new construction or reconstruction). TOPICS projects are to be coordinated with a general plan for the area. Funds for the TOPICS projects will be forthcoming from the Federal Government with the State participation ratio being the same as for projects using Federal Aid-urban funds.

The basic Program intent then is to reduce congestion and facilitate flow of traffic in urban areas. It includes such improvements as channelization of intersections, widening of traffic lanes, signal control systems, modifications to curb parking, etc.

The Federal funds available are matched equally by the Commonwealth of Massachusetts on a 50-50 basis. The City of Boston's contribution will be limited to changes in regulation of parking space, preliminary engineering and supervision, maintenance of the physical improvements which result will be the sole responsibility of the city and will follow appropriate state and national standards.

B. Purpose

The purpose of this report is to demonstrate the adaptation of the TOPICS program in the Financial District of Boston and to substantiate the need for such improvements as come under the scope of TOPICS. This is

accomplished by first reviewing existing traffic conditions and then indicating the needed improvements and the means by which they will be accomplished.

Although the area-wide TOPICS plan for the Boston area is not finished, the fundamental street network of this section of Boston is a fixed and certain commodity. Because of the location of key buildings - existing and under construction or planned - no later plan could substantially modify the street pattern as it now exists. Therefore, any expenditure for a signal system and related hardware will be justified in the future as well as now.

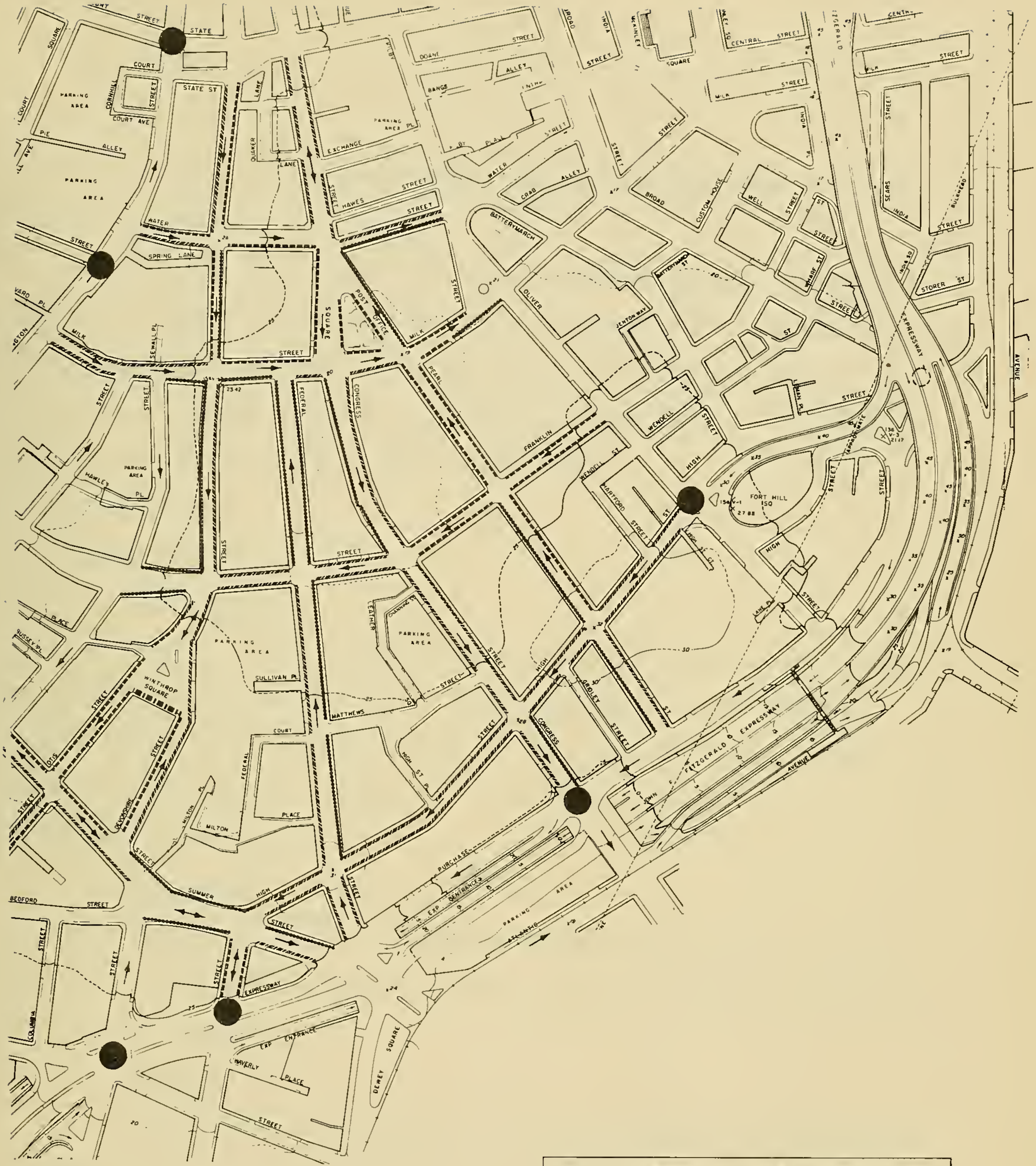
C. Study Area

The area under study in this report is that portion of the central area approximately bounded by Water Street, Oliver Street, Purchase Street, Summer Street, Otis and Devonshire Streets. (See Figure 1).

The primary land use is office buildings (financial and insurance). The street network is characterized as a one-way system of relatively moderate vehicular volume and relatively high pedestrian volume, plus inefficiently allocated and utilized curb parking. There are few signalized intersections and a general lack of other control devices.

The most important traffic arteries are Congress Street, Pearl Street, and High Street. Congress Street is now the main southbound artery and will become even more important when it is linked up, via Merrimack Street, to Leverett Circle and the Central Artery. Pearl Street will be its northbound counterpart through the Financial District. High Street is heavily used since it directly serves the Central Artery off-ramp at its easterly end.

Devonshire-Otis Streets form a distinct alternate southbound route. Milk Street is a strong eastbound path across the district, and will become more



LEGEND:

▬ No Parking Anytime

▨ No Parking 7:00 a.m. to 6:00 p.m.

┅ No Parking 1:00 a.m. to 9:30 a.m., Meter Parking 9:30 a.m. to 6:00 p.m.

╍ No Parking 1:00 a.m. to 9:30 a.m., 2 Hour Parking Limit

● Traffic Signal

BOSTON TRAFFIC AND PARKING DEPARTMENT

EXISTING TRAFFIC CONTROLS AND REGULATION

FINANCIAL DISTRICT
TOPICS IMPROVEMENT PROGRAM

Figure 1

intensely used when it is linked to School Street. Franklin Street will be its westbound counterpart.

At the present time, several very large development projects are underway in the area. Included are the new First National Bank Building and the Keystone Building in the southeasterly section of the district. These projects as well as others in and around the study area will add significantly to the combined pedestrian and vehicular load on the street network.

D. Data Collection

1. Intersections

a. Vehicular

Source for data on vehicular movements at each intersection is the City's Traffic and Parking Department. Data was gathered in late 1969 and early 1970 covering all turning movements at each intersection for a period of 11 hours from 7:00 a.m. to 6:00 p.m. with half-hour tallys. (See Table 1 for summary).

b. Pedestrian

Similarly, all pedestrian movements were recorded for a total of 6 hours at each location during morning, mid-day and late afternoon peak periods. (See Table 1 for summary).

c. Accidents

Accident records (1965-1969) at each intersection for all reported accidents were obtained from the Boston Police Department and summarized by Traffic and Parking Safety Education Division. This data lists fatalities, injuries, frequency, time and nature of accident, for each year. (See Tables 1 and 2 for summary).

TABLE I

EXISTING TRAFFIC CONDITIONS

SUMMARY

INTERSECTION	Vehicle Volumes (Total Per 11 hours)	Pedestrian Volumes (Total Per 6 hours)	Accidents (Average No. Per Year)
1. Water & Devonshire Streets	7,294	*24,243	1.8
2. Water & Congress Streets	12,072	15,935	2.2
3. Milk & Pearl Streets	8,855	14,924	1.5
4. Milk & Congress Streets	*13,214	16,936	4.4
5. Milk & Devonshire Streets	5,040	15,067	2.0
6. Devonshire & Franklin Streets	8,743	16,853	2.6
7. Federal & Franklin Streets	6,218	13,789	5.0
8. Congress & Franklin Streets	7,670	12,217	4.0
9. Franklin & Pearl Streets	3,887	12,148	1.0
10. High & Pearl Streets	9,449	6,480	1.2
11. Congress & High Streets	12,831	6,902	*7.8
12. High & Federal Streets	10,783	14,905	3.8
13. High & Summer Streets	9,703	7,360	1.6
14. Kingston & Otis Streets	7,544	15,424	3.0

* Highest

TABLE 2

ACCIDENT COST SUMMARY

Intersection	Time Period	Fatalities	Injuries	Property Damage	Total Accidents	Ave. No. Acc. Per Year	Total Loss	Average Annual Loss
(1)	5 Years	0	3	8	9	1.8	$ 8,600	$ 1,720
(2)	5 Years	0	5	10	11	2.2	13,000	2,600
(3)	4 Years	0	5	6	6	1.5	11,400	2,850
(4)	5 Years	0	5	21	22	4.4	17,400	3,480
(5)	5 Years	0	3	9	10	2.0	9,000	1,800
(6)	5 Years	0	8	13	13	2.6	19,700	3,940
(7)	5 Years	0	12	25	25	5.0	31,600	6,320
(8)	5 Years	0	16	16	20	4.0	35,200	7,080
(9)	4 Years	0	3	4	4	1.0	7,000	1,750
(10)	4 Years	0	2	4	5	1.2	5,200	1,300
(11)	5 Years	0	13	39	39	7.8	39,000	7,800
(12)	4 Years	0	7	15	15	3.8	18,600	4,650
(13)	5 Years	0	3	8	8	1.6	8,600	1,720
(14)	5 Years	0	4	15	15	3.0	13,200	2,620
TOTALS		0	89	193	202	41.9	237,500	49,630

This data derives from police reports only, and does not include accidents which do occur but are not reported. The data, then, represents a considerable understatement of both the number of accidents occurring and the monetary loss involved. It is estimated that only about 50% of all accidents are reported.

In addition, the unit costs applied to these reported accidents are conservative, deriving from national data. Actual costs in the Boston region are undoubtedly higher than the National averages used. Recent research has shown surprisingly high automobile repair costs arise from very low speed and apparently minor accidents.

d. Physical Characteristics

Scale drawings (1"=20'), have been prepared by the Traffic and Parking Department, showing the basic features of each intersection; alignment, curb lines, building lines, sidewalks, etc.

2. Curb Parking

Information about on-street parking space and regulation was obtained via a field inventory which included measurement of curb faces, curb cuts, street widths, the location of fire hydrants, loading zones, reserved parking spaces, etc.

For details of this parking study, reference is made to the earlier report "Curb Space Allocation Study, Financial District", Murray D. Segal, Transportation Consultant, May 21, 1969.

II. TRAFFIC CONDITIONS

A. Analysis Methodology

1. Signal Warrants

The procedure for determining whether an intersection warrants traffic control signals is explicitly outlined in the "Manual on Uniform Traffic Control Devices for Streets and Highways" adopted by the Federal Highway Administration 1961, (pages 185-190). This method is applied here for the 14 intersections as detailed below. In addition, consideration was given for new development in the Financial District (either under construction now or planned) and unique conditions of short-duration, such as heavy pedestrian vs. vehicular traffic.

In brief, the method consists of reviewing the vehicular volumes present during the 8 highest hours of an average day and determining whether they exceed the levels given for the various warrant conditions. Pedestrian volumes during the same 8 hours are examined to determine if they exceed the levels set under the warrant conditions.

Signals may be warranted also if necessary to maintain progressive movement of traffic through a system of intersections; they may be warranted on the basis of accident experience at the intersection; they may be justified by a combination of the preceding warrants.

2. Curb Parking

Contemplated revisions to parking space allocation and regulation are based on these considerations:

a. Number of lanes needed to provide sufficient capacity for existing volumes:

b. Need for additional traffic lanes at rush hours absolutely clear and free not only of parked vehicles but of standing vehicles as well;

c. Requirements for truck loading zones, cab stands, bus stops, fire hydrants, alleys, reserved spaces for government officials etc.;

d. Need to provide more intensive use of space available (shorter term, greater turnover).

Again, reference is made to report cited earlier (Segal, 1969) for details of this analysis

B. Parking Regulations

1. Existing (See Figure 1).

Existing parking regulations consist of four categories as follows:

a. "NO PARKING" anytime

b. "NO PARKING" 7:00 a.m.-6:00 p.m.

c. "NO PARKING" 1:00 a.m.-9:30 a.m. with meter parking 9:30 a.m.-6:00 p.m.

d. "NO PARKING" 1:00 a.m.-9:30 a.m. with 2-hour limit other times. (See Figure 1 for locations).

2. Proposed (See Figure 2).

Proposed parking regulations consist of the following:

a. Six categories which include "NO STANDING" at certain hours, three of which include "NO PARKING" at anytime, and three of which include metered parking;

b. "NO PARKING" anytime;

c. 1-hour and 1/2 hour metered parking.

There will no longer be a 2-hour parking limit; the longest limit proposed is 1-hour and some selective use will be made of 30-minute meters. (See Figure 2 for locations; Table 3 for tabulation).

3. Comparison Parking

Table 3 summarizes the relation between existing and proposed parking conditions.

III. PROPOSED SIGNALIZATION PROJECT

A. Signal System

1. General Description

The proposed new signal system (See Figure 3) will have the following general characteristics:

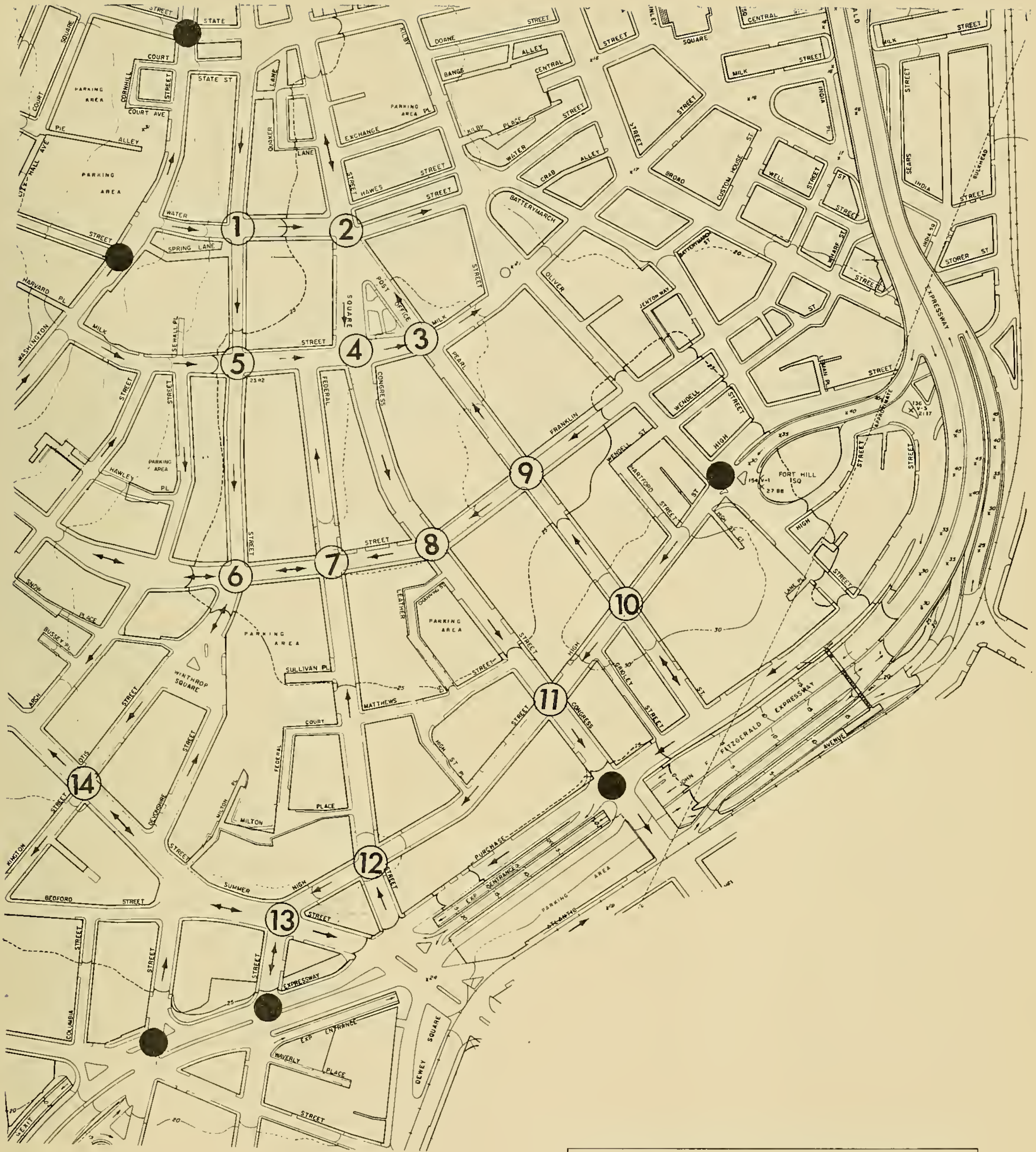
a. A master controller (multi-dial) will be located in City Hall, interconnected to all 14 intersections discussed.

b. Each intersection will have a separate controller of the following description: fixed-time, with vehicular progression, pedestrian actuation, and interconnection to the master controller.

c. Interconnection and all other wiring will be by underground cable.

d. There will be 2 vehicular indications on the far side of the intersection for each approaching stream of traffic plus a pedestrian indication facing each crosswalk.

e. Pedestrian actuation will be by pushbuttons on the downstream side of the intersection. Pedestrians will be phased with the traffic on the upstream side of the intersection.



LEGEND

⑫ Proposed Signal Installation and I.D. Number

● Existing Signal Installation

BOSTON TRAFFIC AND PARKING DEPARTMENT

PROPOSED SIGNAL SYSTEM

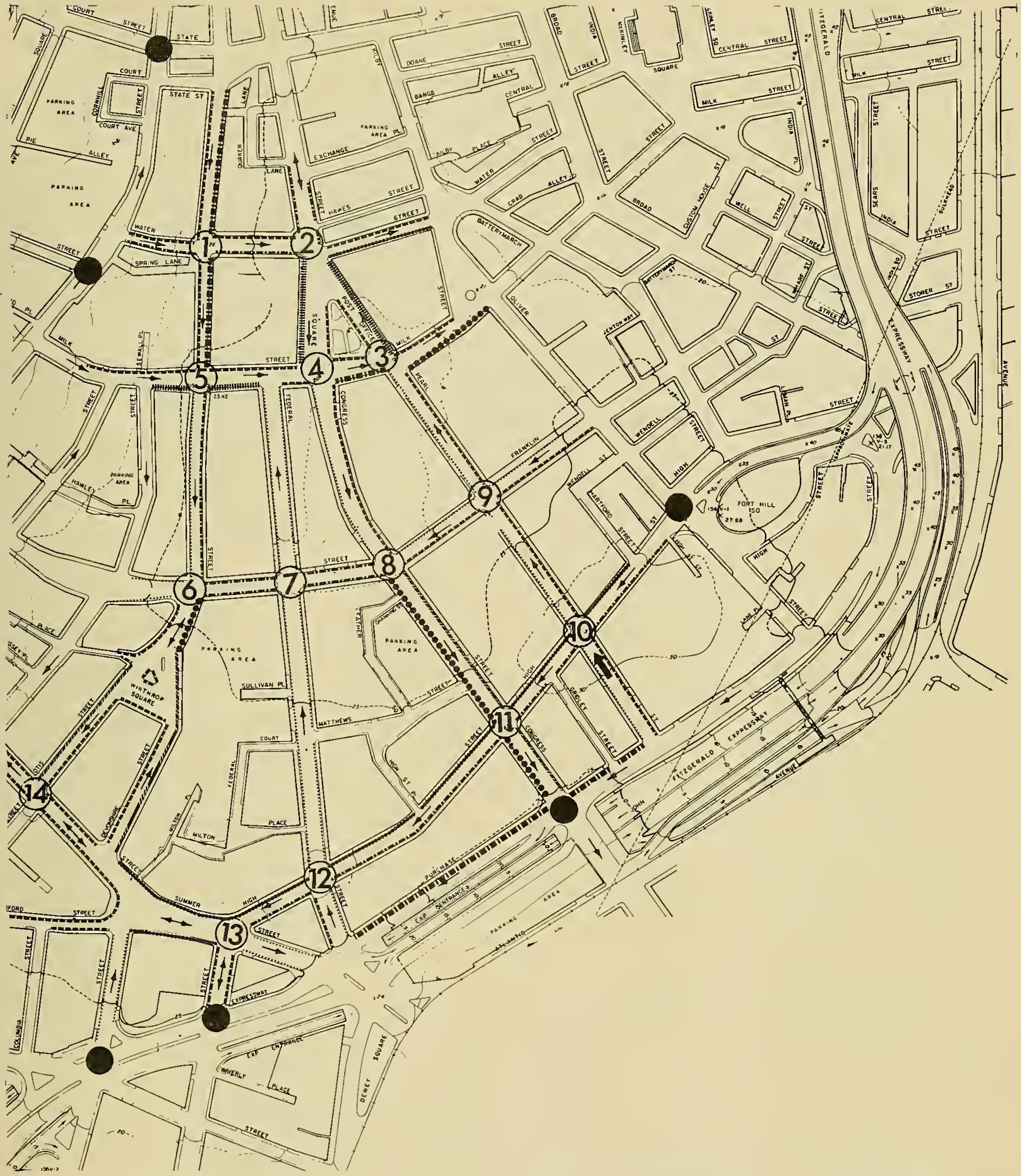
FINANCIAL DISTRICT
TOPICS IMPROVEMENT PROGRAM

Figure 2

TABLE 3

SUMMARY OF PARKING REGULATION CHANGES

ITEM	Existing	Proposed	Change	Percent Of Change
Lin. Ft. Regulated Curb (Includes No Parking)	20,500	20,500	0	0
Lin. Ft. Curb Parking Available	4,880	10,230	+5350	+110
No. of Meters	155	319	+164	+106%
Lin. Ft. "NO-STANDING" Regulation	0	7,660	+7,660	+00%



LEGEND:

- No Parking Anytime
- Proposed One Way
- No Parking Anytime – No Standing 7:00 to 9:30 a.m. & 4:00 to 6:00 p.m.
- No Parking Anytime – No Standing 7:00 to 9:30 a.m.
- No Parking Anytime – No Standing 4:00 to 6:00 p.m.
- 1 Hour Meters
- 30 Minute Meters
- 1 Hr. Meters – No Standing 7 to 9:30 a.m.
- 1 Hr. Meters – No Standing 4 to 6 p.m.
- 30 Min. Meters – No Standing 4 to 6 p.m.

● Traffic Signal

⑫ Proposed Signal

BOSTON TRAFFIC AND PARKING DEPARTMENT

PROPOSED PARKING REGULATION

FINANCIAL DISTRICT
TOPICS IMPROVEMENT PROGRAM

Figure 3

2. Proposed Installations

Traffic and pedestrian volume, accident experience and preliminary layouts for the system are discussed individually in the following pages. Each intersection is identified by the key number which appears in Figure 3.

a. Intersection 1 - Devonshire and Water Streets (See Figure 4)

Vehicular Volume (11 hours): 7,294

Pedestrian Volume (6 hours): 24,243

Accidents reported (average per year): 1.8

Water Street, one-way east-bound, intersects Devonshire Street one-way south-bound at this point (Figure 4). There are no traffic signals in existence at this or any of the 14 intersections under discussion. Traffic here is moderate but the streets are narrow and the poor alignment of Water Street makes this a hazardous crossing. Extremely high pedestrian volumes at all three peak periods (in fact, the highest of all these 14 intersections) warrant signals for pedestrian use at least 6 hours per weekday.

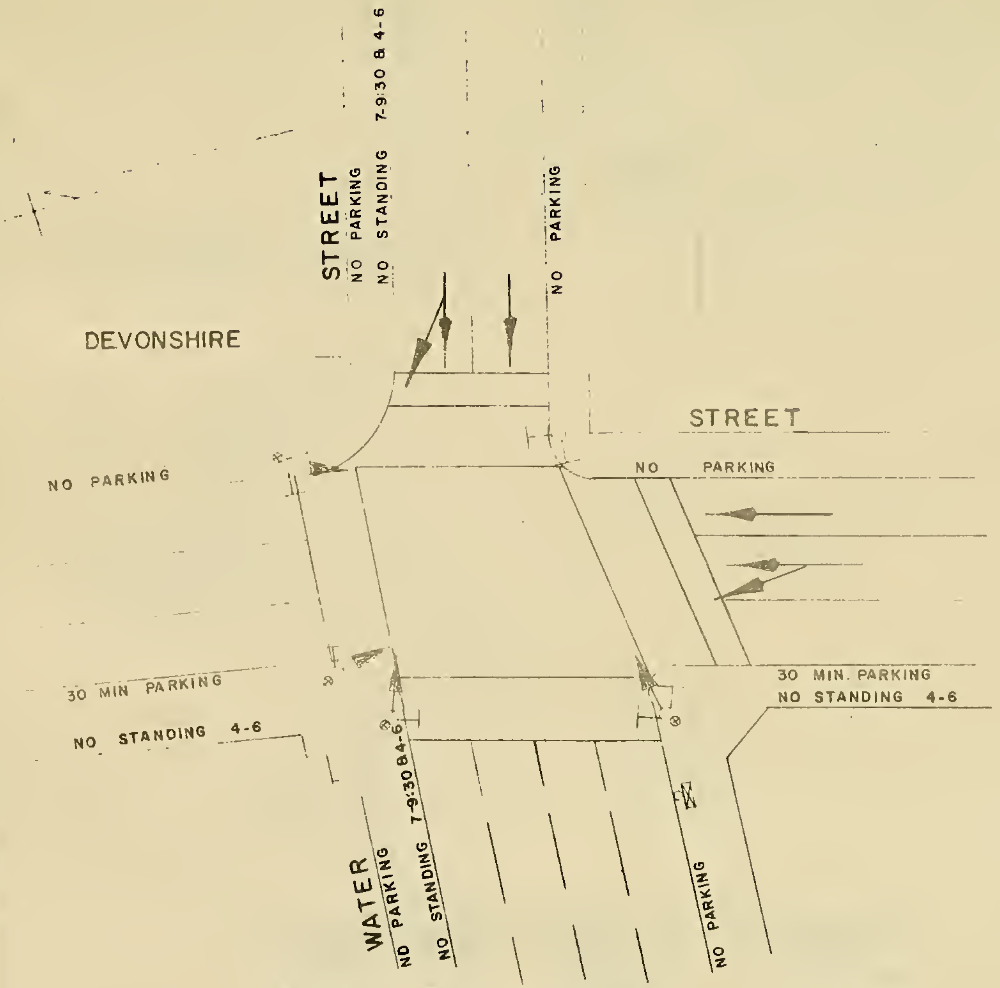
b. Intersection 2 - Congress and Water Streets (See Figure 5)

Vehicular volume (11 hours): 12,072

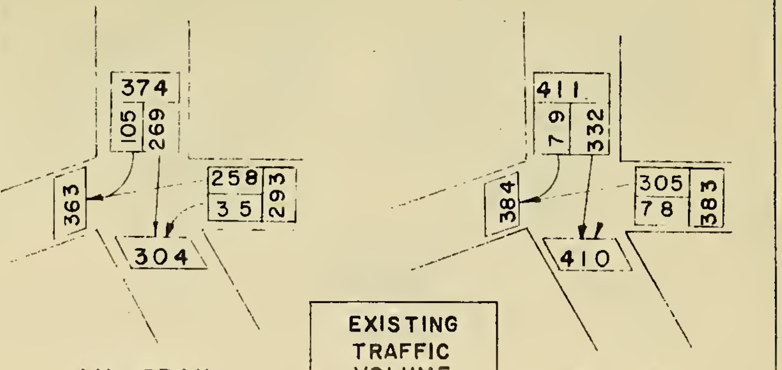
Pedestrian volume (6 hours): 15,935

Accidents reported (average per year): 2.2

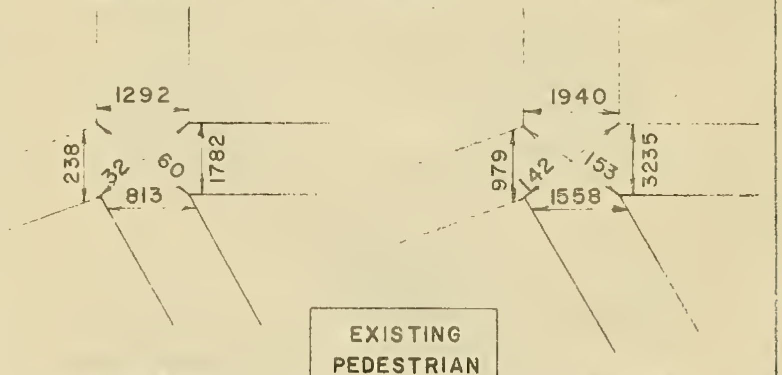
At this complex intersection north of Post Office Square, Water Street one-way east-bound crosses Congress Street which is one-way south-bound at Post Office Square and two-way north of the intersection, Pearl Street enters one-way north-bound from the Square.



PROPOSED SIGNAL LAYOUT AND OPERATIONS PLANS



EXISTING TRAFFIC VOLUME



EXISTING PEDESTRIAN VOLUME

Number of Accidents Reported (65-69)	- 9
Number of Injuries	- 3
Number of Fatalities	- 0
Direct Annual Accident Loss	- $ 1720

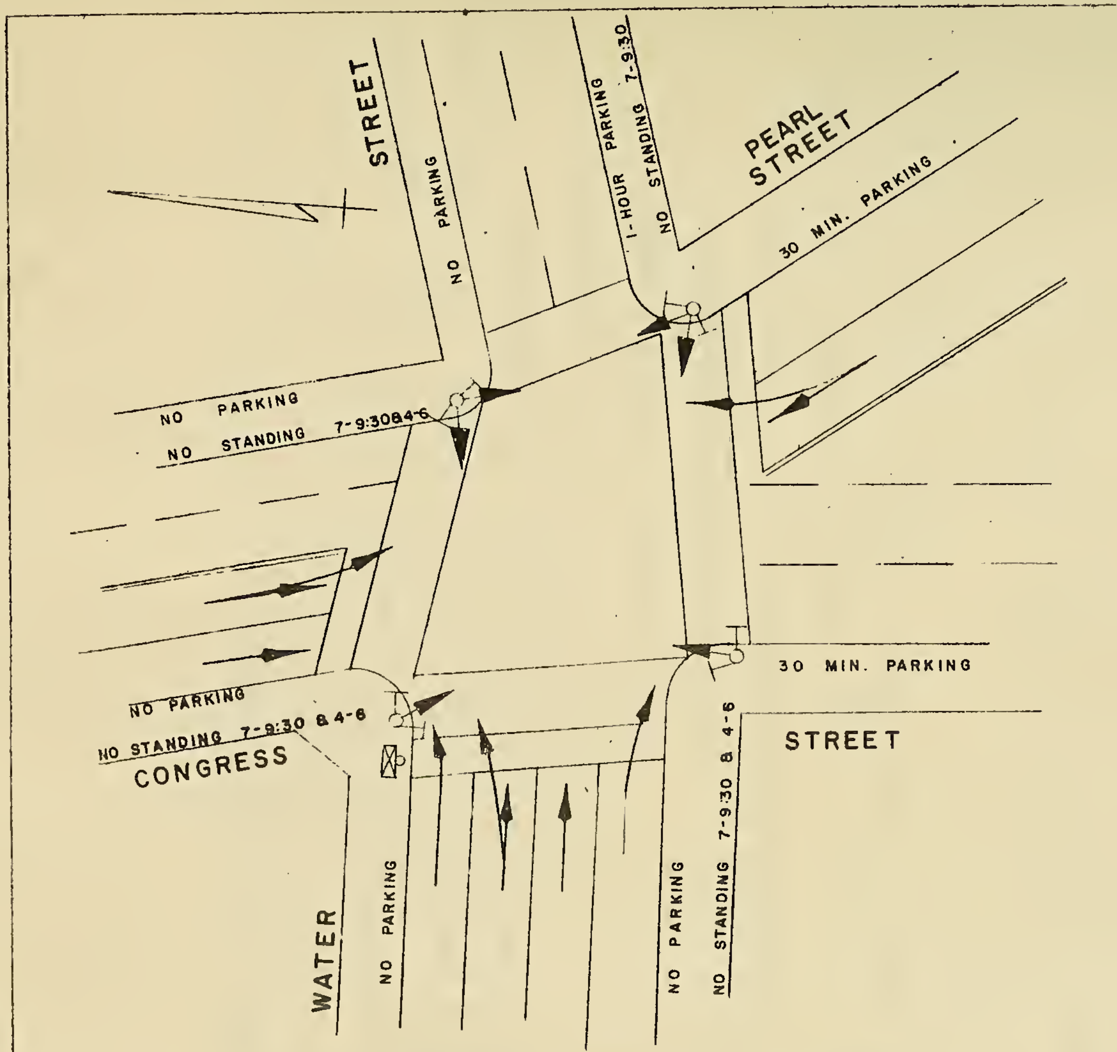
ACCIDENT SUMMARY

BOSTON TRAFFIC & PARKING DEPARTMENT

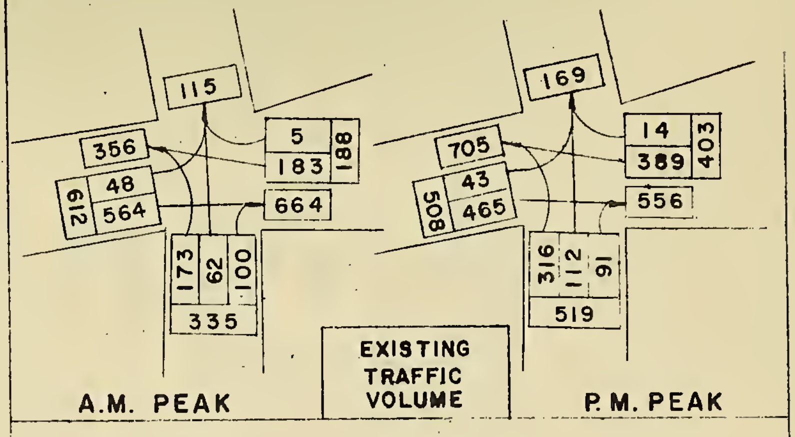
INTERSECTION OF
DEVONSHIRE & WATER STS.

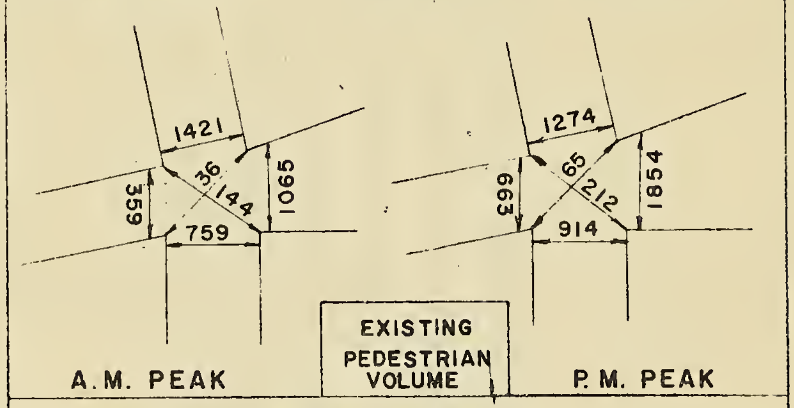
FINANCIAL DISTRICT
TOPICS IMPROVEMENT PROGRAM

FIGURE 4



PROPOSED SIGNAL LAYOUT AND OPERATIONS PLANS





Number of Accidents Reported (65-69) - 11
Number of Injuries - 5
Number of Fatalities - 0
Direct Annual Accident Loss - $ 2600

ACCIDENT SUMMARY

BOSTON TRAFFIC & PARKING DEPARTMENT

INTERSECTION OF

CONGRESS & WATER STS.

FINANCIAL DISTRICT
TOPICS IMPROVEMENT PROGRAM

FIGURE 5

Traffic is sufficiently heavy here to warrant signals on the basis of Warrant 1 (Minimum Vehicular Volume). Heavy pedestrian volume also indicates a need for pedestrian signal control.

It can be seen from Figure 5 how enforcement of proposed "NO STANDING" regulations will guarantee badly needed curb lanes during peak hours.

c. Intersection 3 - Milk and Pearl Streets (See Figure 6)

Vehicular volume (11 hours): 8,855

Pedestrian volume (6 hours): 14,924

Accidents reported (average per year): 1.5

On the south side of Post Office Square, Milk Street one-way east-bound crosses Pearl Street one-way north-bound. Both streets carry moderate traffic and sufficient pedestrian volume to require signal control under the pedestrian warrant.

The proposed "NO STANDING" regulation on Milk Street will help release an additional lane at peak hours. (See Figure 6).

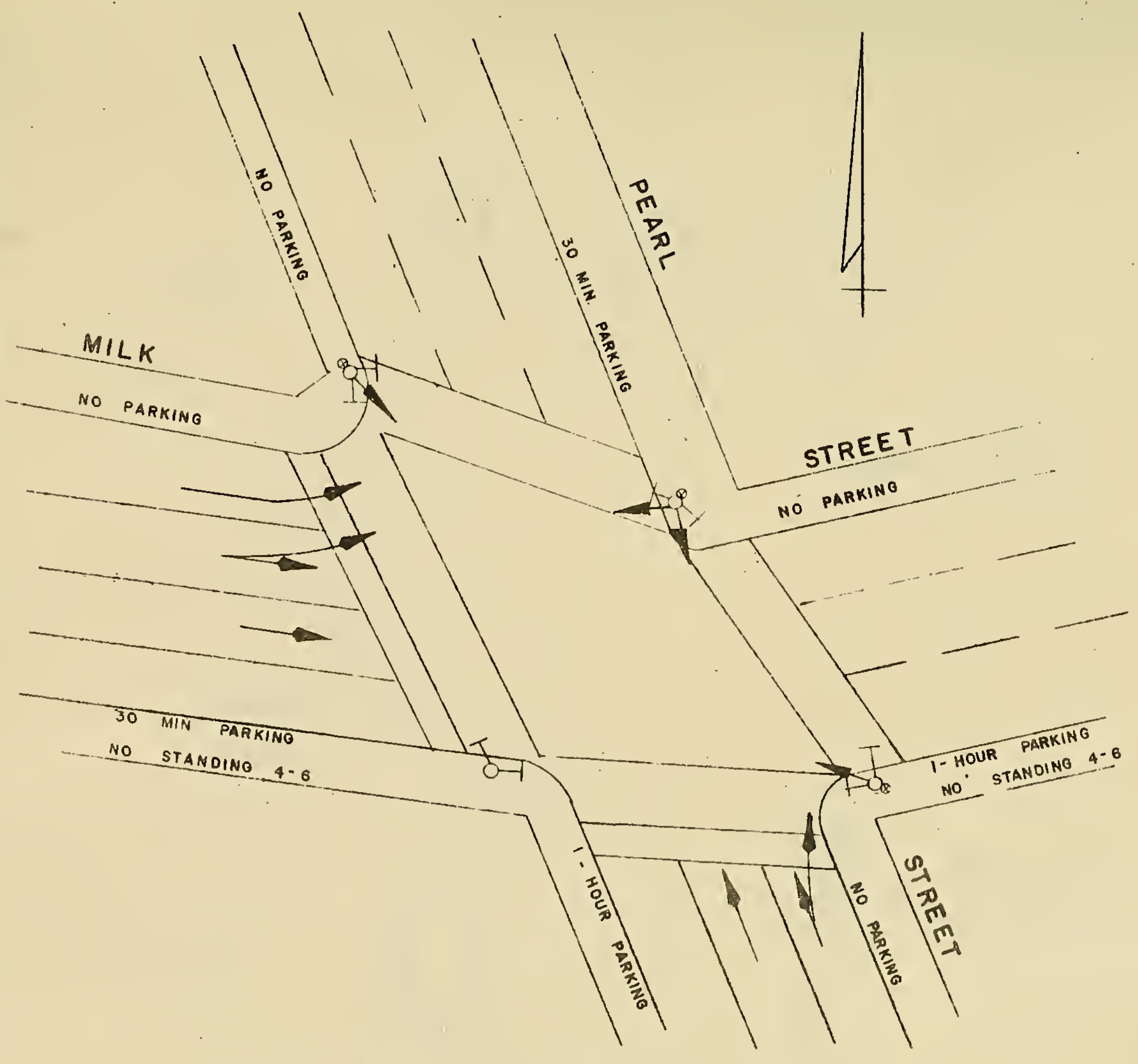
d. Intersection 4 - Milk and Congress Streets (See Figure 7)

Vehicular volume (11 hours): 13,214

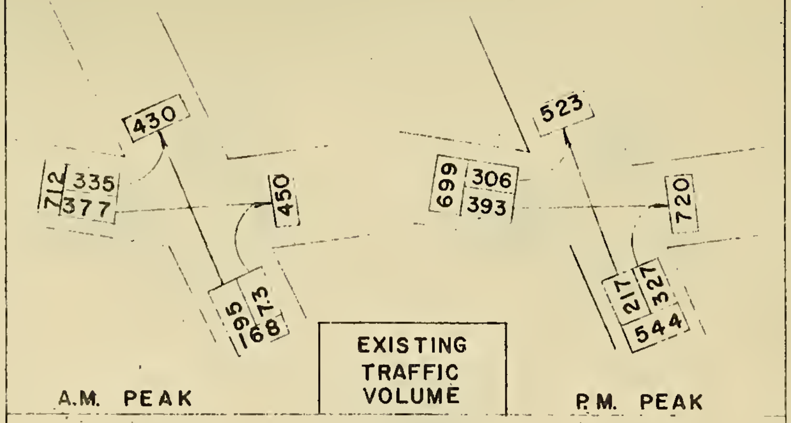
Pedestrian volume (6 hours): 16,936

Accidents reported (average per year) 4.4

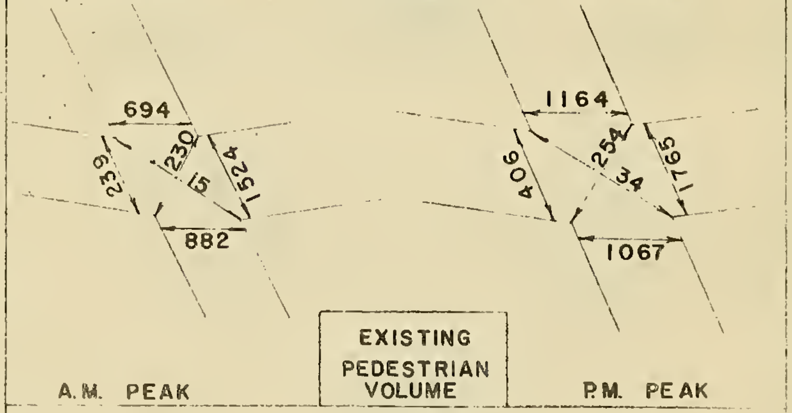
Milk Street one-way east-bound crosses Congress Street one-way south-bound at Post Office Square. This intersection of two major streets carries the highest volume of vehicles of any of the 14 intersections considered. That volume alone warrants traffic signals, but pedestrian traffic is also heavy enough to call for signal control. In addition, the accident expense



PROPOSED SIGNAL LAYOUT AND OPERATIONS PLANS



EXISTING TRAFFIC VOLUME



EXISTING PEDESTRIAN VOLUME

Number of Accidents Reported (65-69) - 6
Number of Injuries - 5
Number of Fatalities - 0
Direct Annual Accident Loss - $ 2850

ACCIDENT SUMMARY

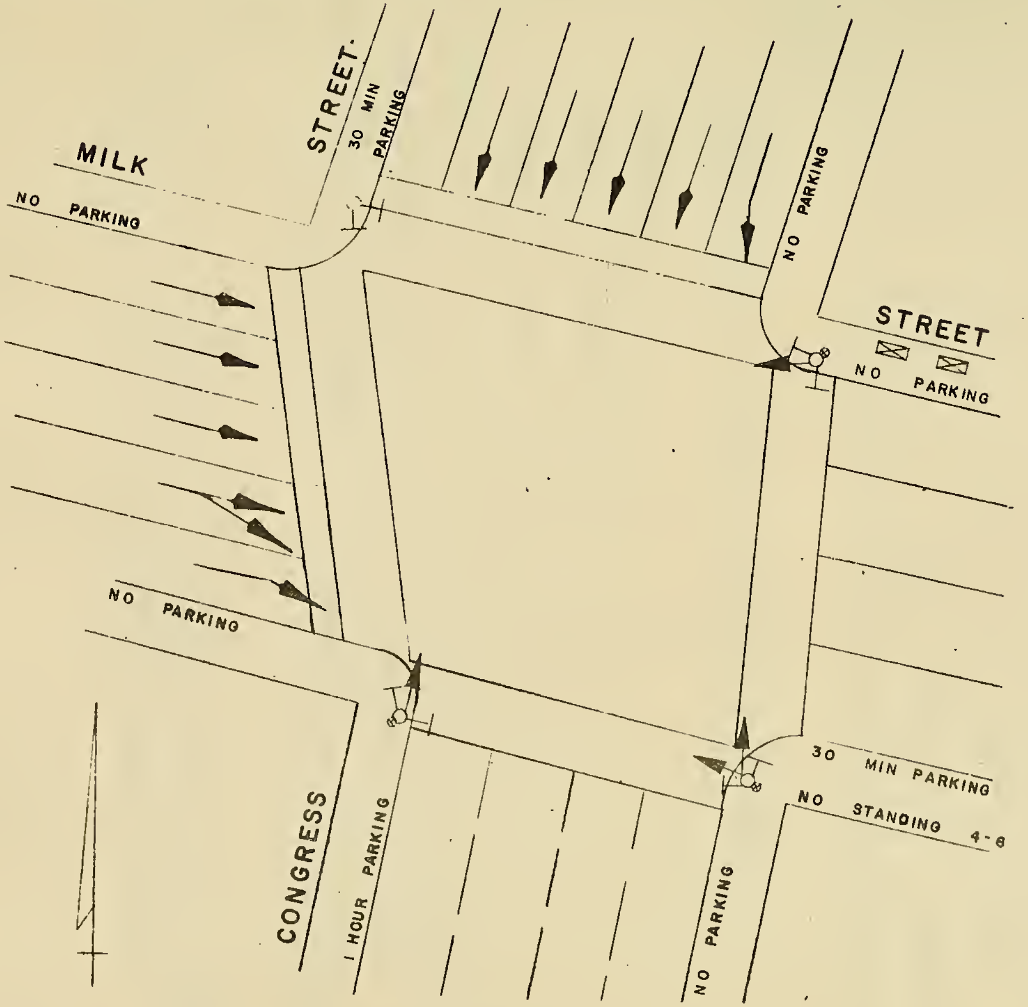
BOSTON TRAFFIC & PARKING DEPARTMENT

INTERSECTION OF

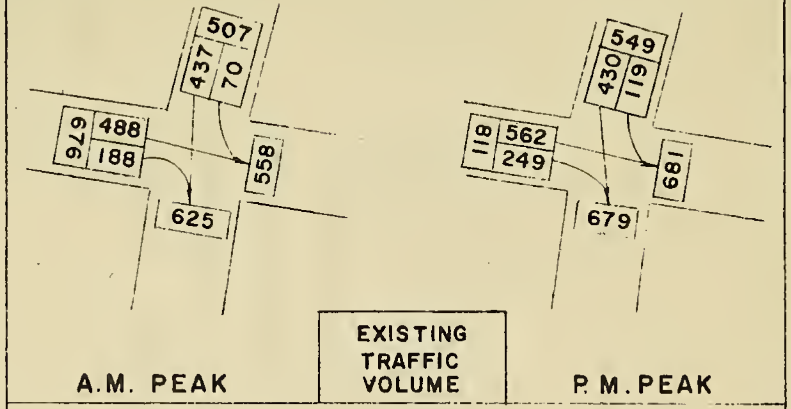
MILK & PEARL STS.

FINANCIAL DISTRICT
TOPICS IMPROVEMENT PROGRAM

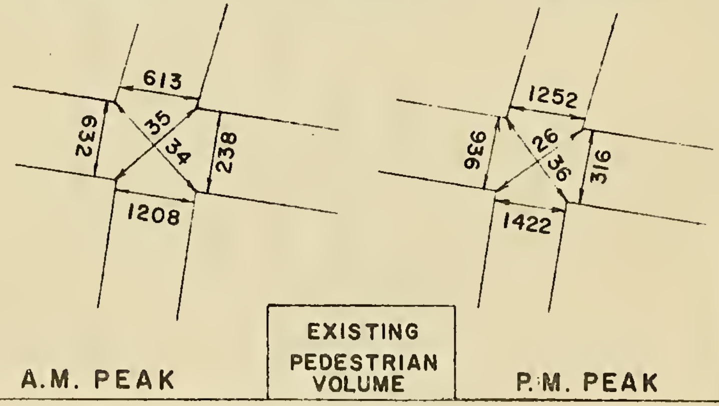
FIGURE 6



PROPOSED SIGNAL LAYOUT
AND
OPERATIONS PLANS



EXISTING TRAFFIC VOLUME



EXISTING PEDESTRIAN VOLUME

Number of Accidents Reported (65-69)	- 22
Number of Injuries	– 5
Number of Fatalities	– 0
Direct Annual Accident Loss	- $ 3480

ACCIDENT SUMMARY

BOSTON TRAFFIC & PARKING DEPARTMENT

INTERSECTION OF

MILK & CONGRESS STS.

FINANCIAL DISTRICT
TOPICS IMPROVEMENT PROGRAM

FIGURE 7

would indicate a need for signals. Figure 4 shows the proposed changes in parking adjacent to Post Office Square which will improve operations.

e. Intersection 5 - Devonshire and Milk Streets (See Figure 8).

Vehicular Volume (11 hours): 5,040

Pedestrian Volume (6 hours): 15,067

Accidents reported (average per year) 2.0

Milk Street, a major one-way east-bound street, crosses Devonshire Street, a narrow one-way south-bound street here. This intersection is characterized by relatively light vehicle volume but heavy pedestrian crossings. Pedestrian safety and the need to maintain signal progression along Devonshire Street point to the need for signal control here. Planned development for the block will increase both pedestrian and motor vehicular traffic. (See Figure 8).

f. Intersection 6 - Devonshire and Franklin Streets (See Figure 9).

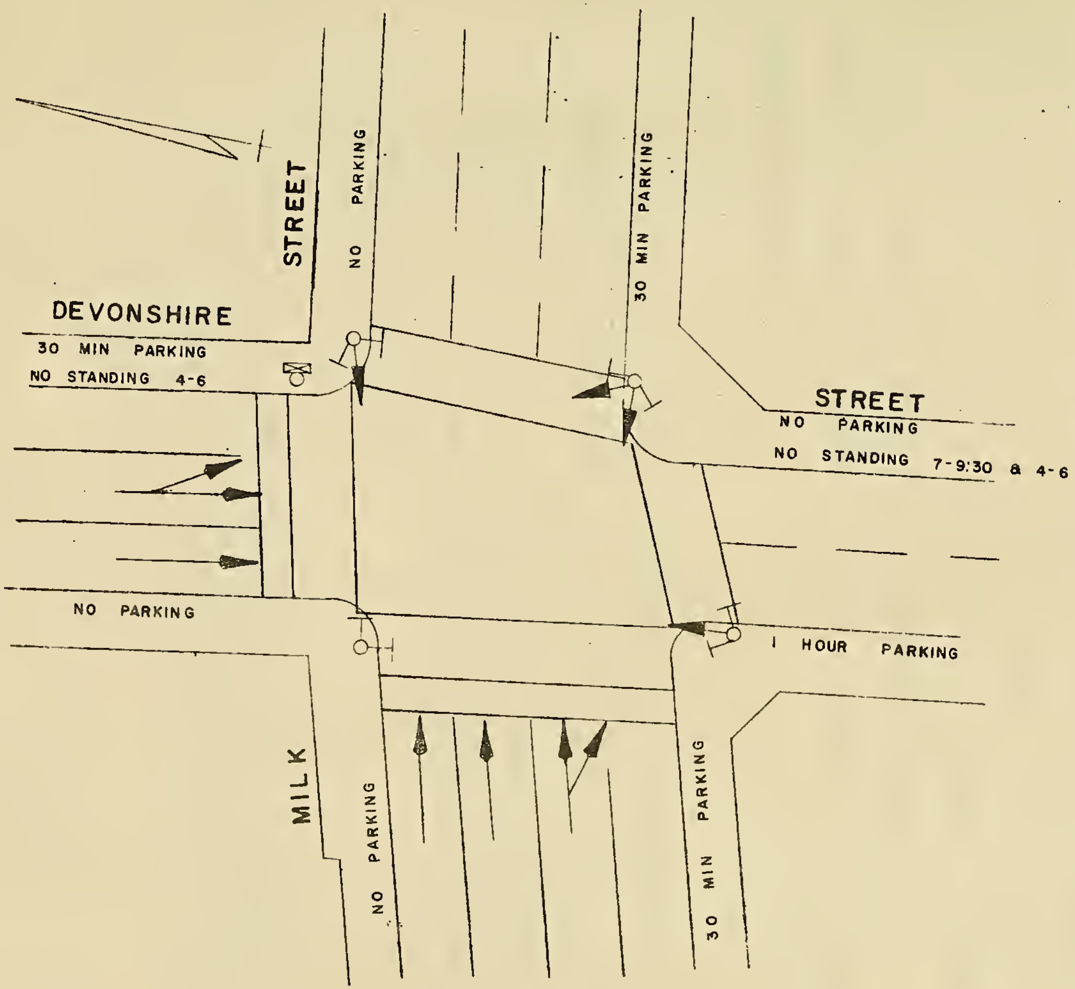
Vehicular Volume (11 hours): 8,743

Pedestrian Volume (6 hours): 16,853

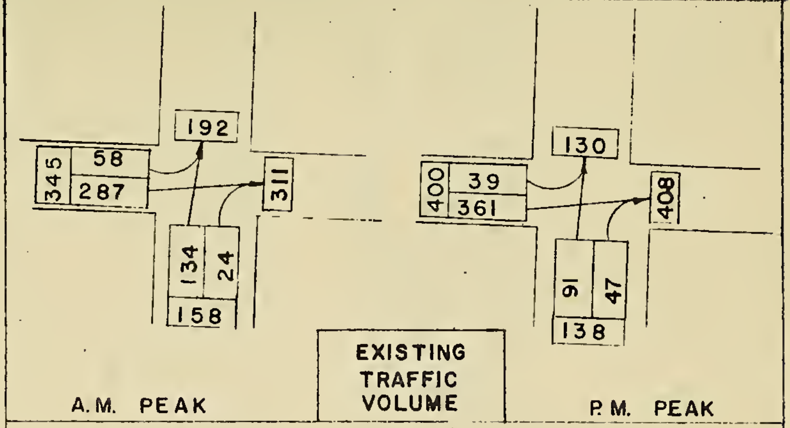
Accidents reported (average per year): 2.6

Franklin Street, a major east-west route (two-way at this intersection) crosses Devonshire Street which is one-way south-bound (north of the intersection) and is two-way (south of the intersection) in combination with Otis Street.

This crossing just north of Winthrop Square carries moderate auto traffic, a heavy pedestrian flow, and has some undesirable alignment features.



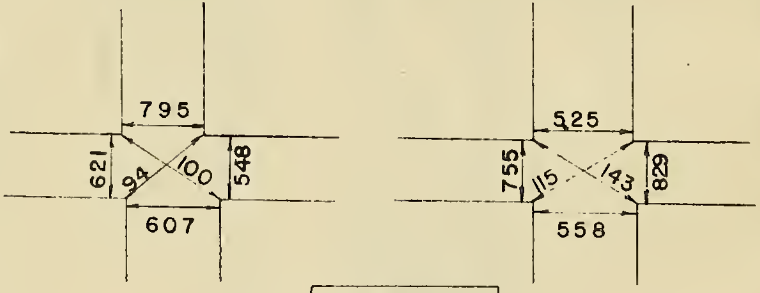
PROPOSED SIGNAL LAYOUT
AND
OPERATIONS PLANS



A.M. PEAK

EXISTING TRAFFIC VOLUME

P.M. PEAK



A.M. PEAK

EXISTING PEDESTRIAN VOLUME

P.M. PEAK

Number of Accidents Reported (65-69)	- 10
Number of Injuries	- 3
Number of Fatalities	- 0
Direct Annual Accident Loss	- $1800

ACCIDENT SUMMARY

BOSTON TRAFFIC & PARKING DEPARTMENT

INTERSECTION OF

DEVONSHIRE & MILK STS.

FINANCIAL DISTRICT
TOPICS IMPROVEMENT PROGRAM

FIGURE 8

The level of vehicle traffic is moderate, and the pedestrian load lighter than at most of the other locations. However, examination of the hourly volumes shows signals to be warranted on a combined vehicle-pedestrian basis.

n. Intersection 14 - Kingston, Otis and Summer Streets (see Figure 17).

Vehicular volume (11 hours): 7,544

Pedestrian volume (6 hours): 15,424

Accidents reported (average per year) 3.0

Flow of traffic and pedestrians is complicated at this intersection by the centerline offset of Kingston and Otis Streets. Summer Street is one-way west-bound on the west and a two-way street on the east. There is moderate auto traffic, a heavy pedestrian flow, and a moderate accident rate. Signals are needed for pedestrian safety and overall system signal progression.

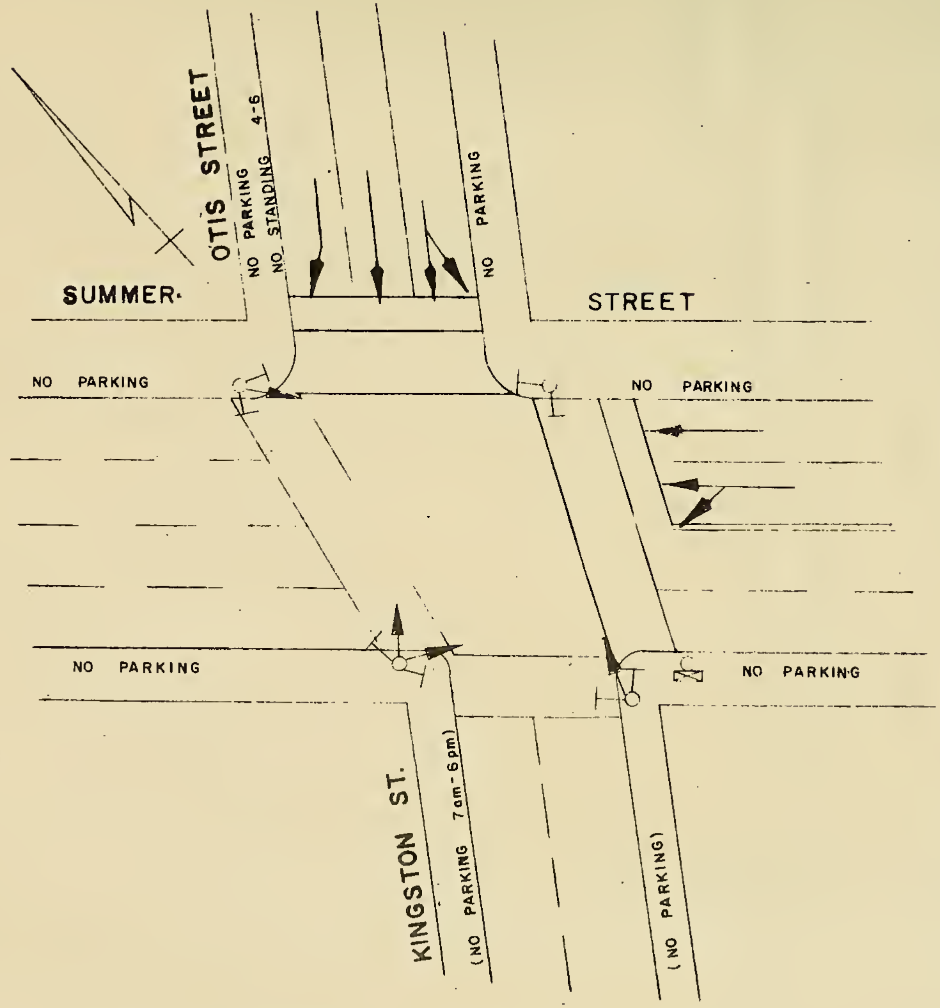
B. Parking - Execution

1. Towing

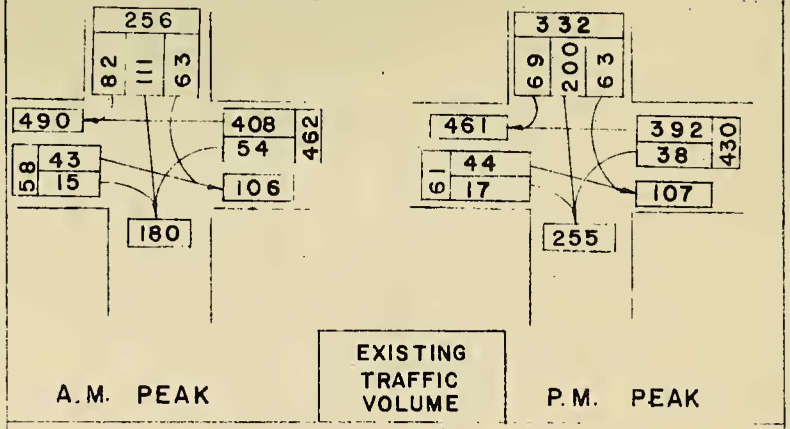
To properly implement the proposed signalization system, it is the intention of the Traffic and Parking Department of the City of Boston to include the Financial District within the scope of its newly organized tow program. Tow trucks have been purchased and will be intensely utilized to clear the desired lanes at peak hours.

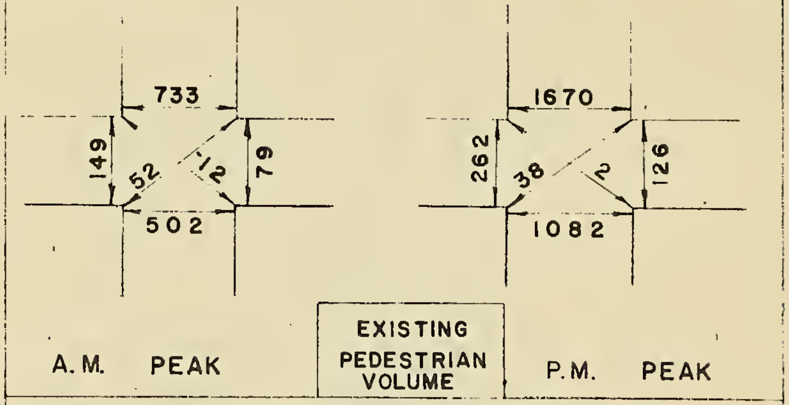
2. Enforcement

Concurrent with towing, strict enforcement of the "NO STANDING" "NO PARKING" and other regulation will be maintained to insure the required number of lanes to move rush hour traffic.



PROPOSED SIGNAL LAYOUT
AND
OPERATIONS PLANS





Number of Accidents Reported (65-69) - 15
Number of Injuries - 4
Number of Fatalities - 0
Direct Annual Accident Loss -$2620

ACCIDENT SUMMARY

BOSTON TRAFFIC & PARKING DEPARTMENT

INTERSECTION OF
KINGSTON, OTIS & SUMMER STS.

FINANCIAL DISTRICT
TOPICS IMPROVEMENT PROGRAM

FIGURE 17

IV. COSTS

Estimated costs for the proposed signal installations appear in Table 4. Included in the total is an allowance for engineering and construction of "special bases" (See line 15, Table 4) which will be required for some 20 of the signal supports. These 20 supports are located over underground facilities (i.e. "Areaways") and will necessitate structural and installation provisions well beyond the ordinary. Costs have been estimated on the basis of preliminary engineering design for several typical installations.

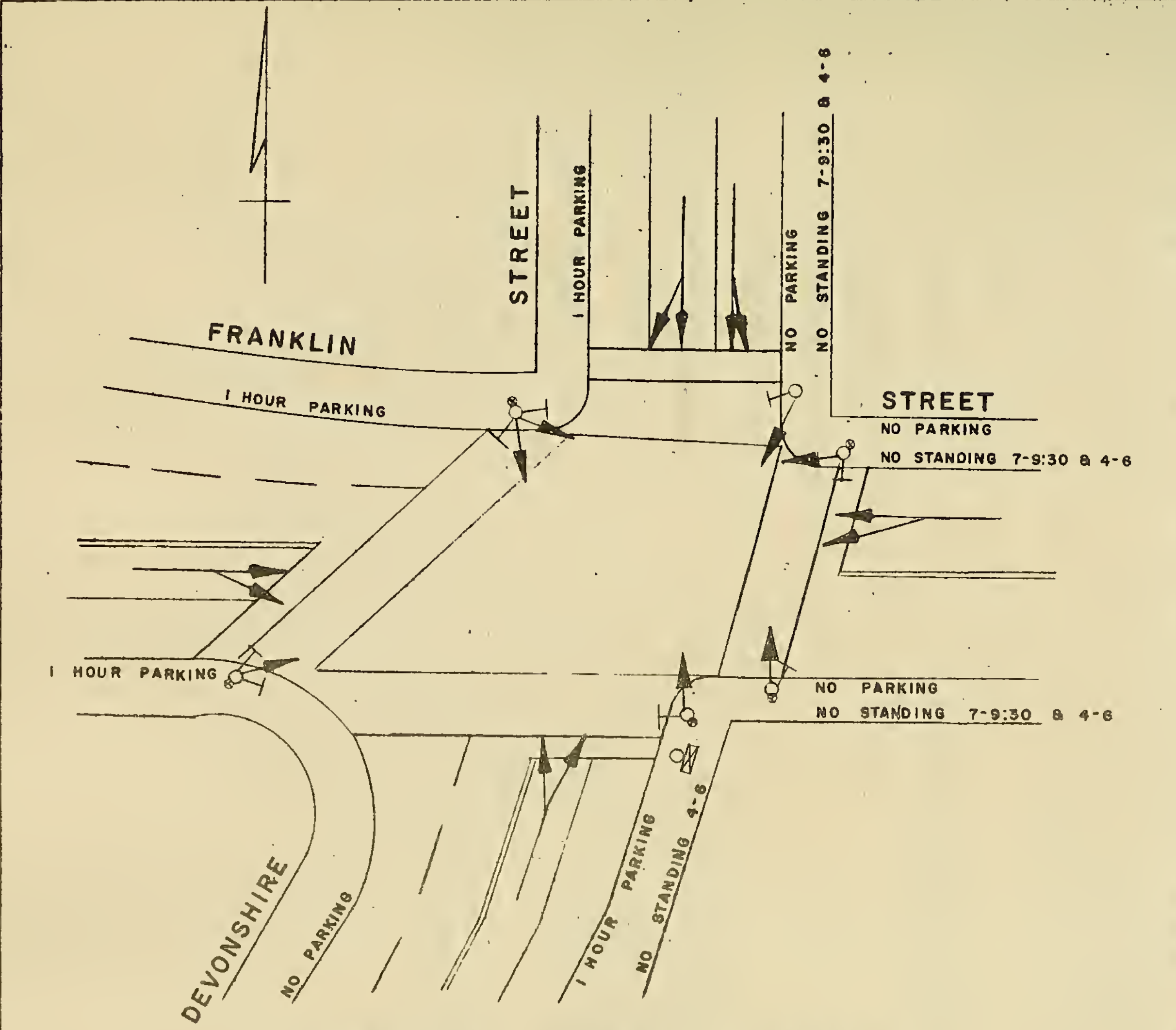
Cost of electrical inter-connection of the fourteen new installations and the adjacent existing signals is distributed over the individual locations as is the cost of the cable connection to the master controller at City Hall.

It has been assumed that the engineering of the signals will be the responsibility of the Traffic and Parking Depament with reimbursement through TOPICS funds.

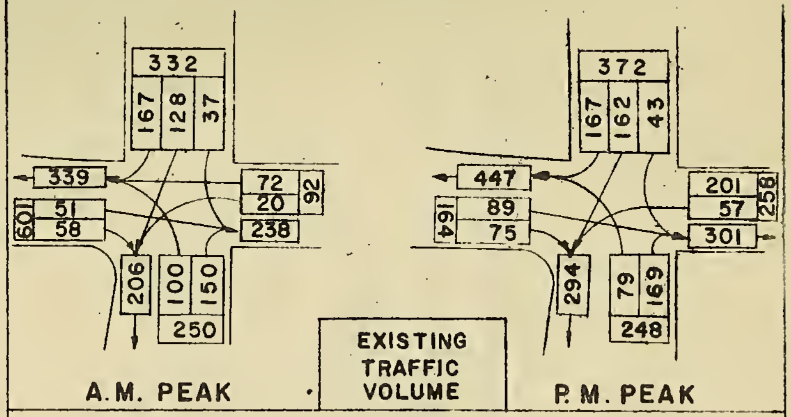
TABLE 4

SUMMARY OF ESTIMATED COST

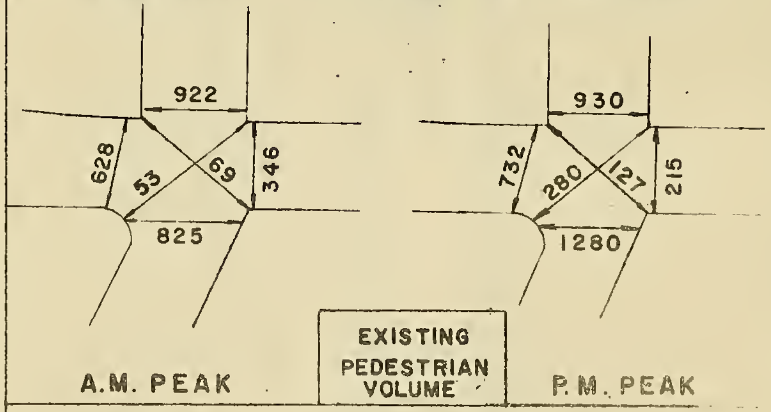
ITEM	ESTIMATED COST
1. Signals; Devonshire and Water Streets	14,100
2. Signals; Congress and Water Streets	14,800
3. Signals; Milk, Congress and Pearl Streets	28,700
4. Signals; Devonshire and Milk Streets	12,900
5. Signals; Devonshire and Franklin Streets	16,300
6. Signals; Federal and Franklin Streets	16,400
7. Signals; Congress and Franklin Streets	12,800
8. Signals; Kingston, Otis and Summer Streets	17,100
9. Signals; High, South and Summer Streets	17,400
10. Signals; Federal and High Streets	15,300
11. Signals; Congress and High Streets	17,900
12. Signals; Franklin and Pearl Streets	12,400
13. Signals; High and Pearl Streets	12,200
14. Master Controller	2,500
15. Special Bases	60,000
16. Subtotal	270,000
17. Contingencies (to % line, 16)	27,000
18. Total Cost	297,000



PROPOSED SIGNAL LAYOUT AND OPERATIONS PLANS



EXISTING TRAFFIC VOLUME



EXISTING PEDESTRIAN VOLUME

Number of Accidents Reported (65-69) - 13
Number of Injuries - 8
Number of Fatalities - 0
Direct Annual Accident Loss - $ 3940

ACCIDENT SUMMARY

BOSTON TRAFFIC & PARKING DEPARTMENT

INTERSECTION OF

DEVONSHIRE & FRANKLIN STS.

FIGURE 9

FINANCIAL DISTRICT
TOPICS IMPROVEMENT PROGRAM

A combined vehicle-pedestrian signal warrant is derived from the data for at least 6 hours per weekday here.

g. Intersection 7 - Federal and Franklin Streets (See Figure 10).

Vehicular volume (11 hours): 6,218

Pedestrian volume (6 hours): 13,789

Accidents reported (average per year) 5.0

Federal Street, one-way north-bound, crosses Franklin Street which is two-way (west of here) and one-way west-bound (east of this point). This intersection has good alignment, moderate traffic, a strong pedestrian flow and a bad accident record. Signals are justified here in view of pedestrian safety and the need to reduce the accident rate.

h. Intersection 8 - Congress and Franklin Streets (See Figure 11).

Vehicular volume (11 hours): 7,670

Pedestrian volume (6 hours): 12,217

Accidents reported (average per year): 4.0

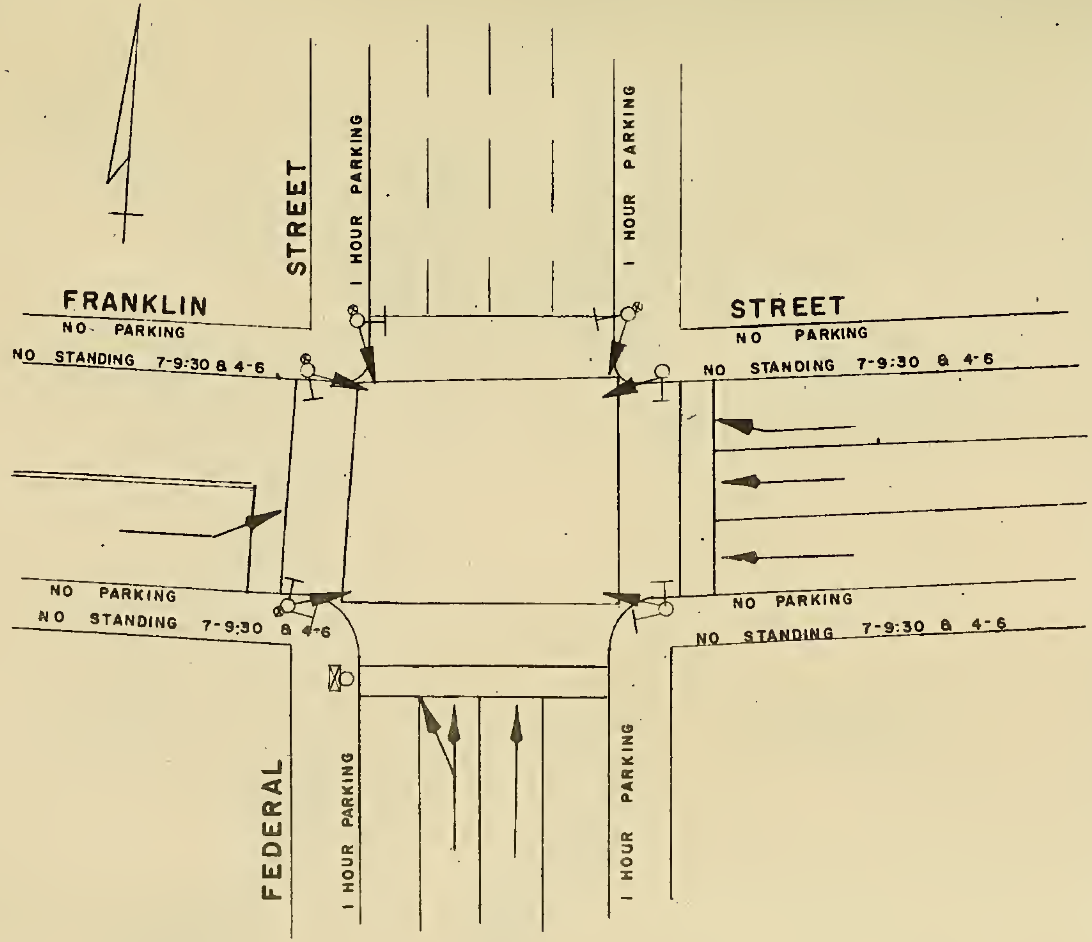
Congress is one-way south-bound and Franklin is one-way west-bound at the location. Both streets carry moderate auto loads, a heavy pedestrian load and the overall accident rate is high. Signals are needed for pedestrian safety and to maintain signal progression.

i. Intersection 9 - Franklin and Pearl Streets (See Figure 12).

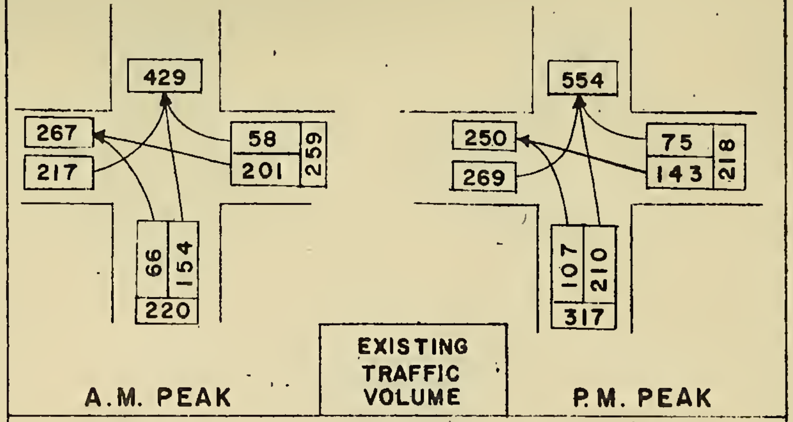
Vehicular volume (11 hours): 3,887

Pedestrian volume (6 hours): 12,148

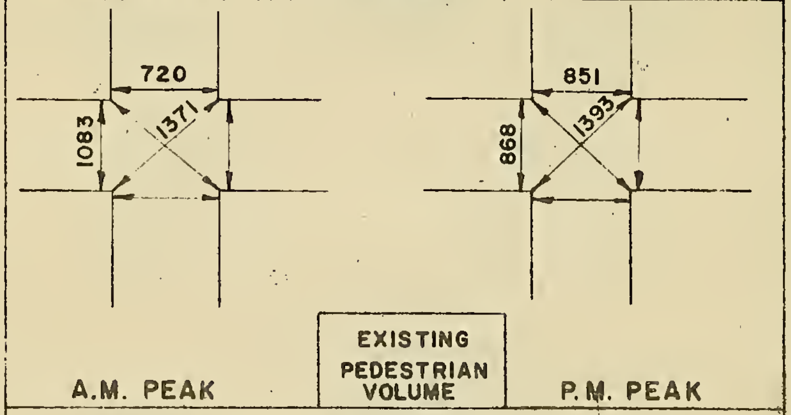
Accidents reported (average per year) 1.0



PROPOSED SIGNAL LAYOUT
AND
OPERATIONS PLANS



EXISTING TRAFFIC VOLUME



EXISTING PEDESTRIAN VOLUME

Number of Accidents Reported (65-69) - 25
Number of Injuries - 12
Number of Fatalities - 0
Direct Annual Accident Loss - $ 6320

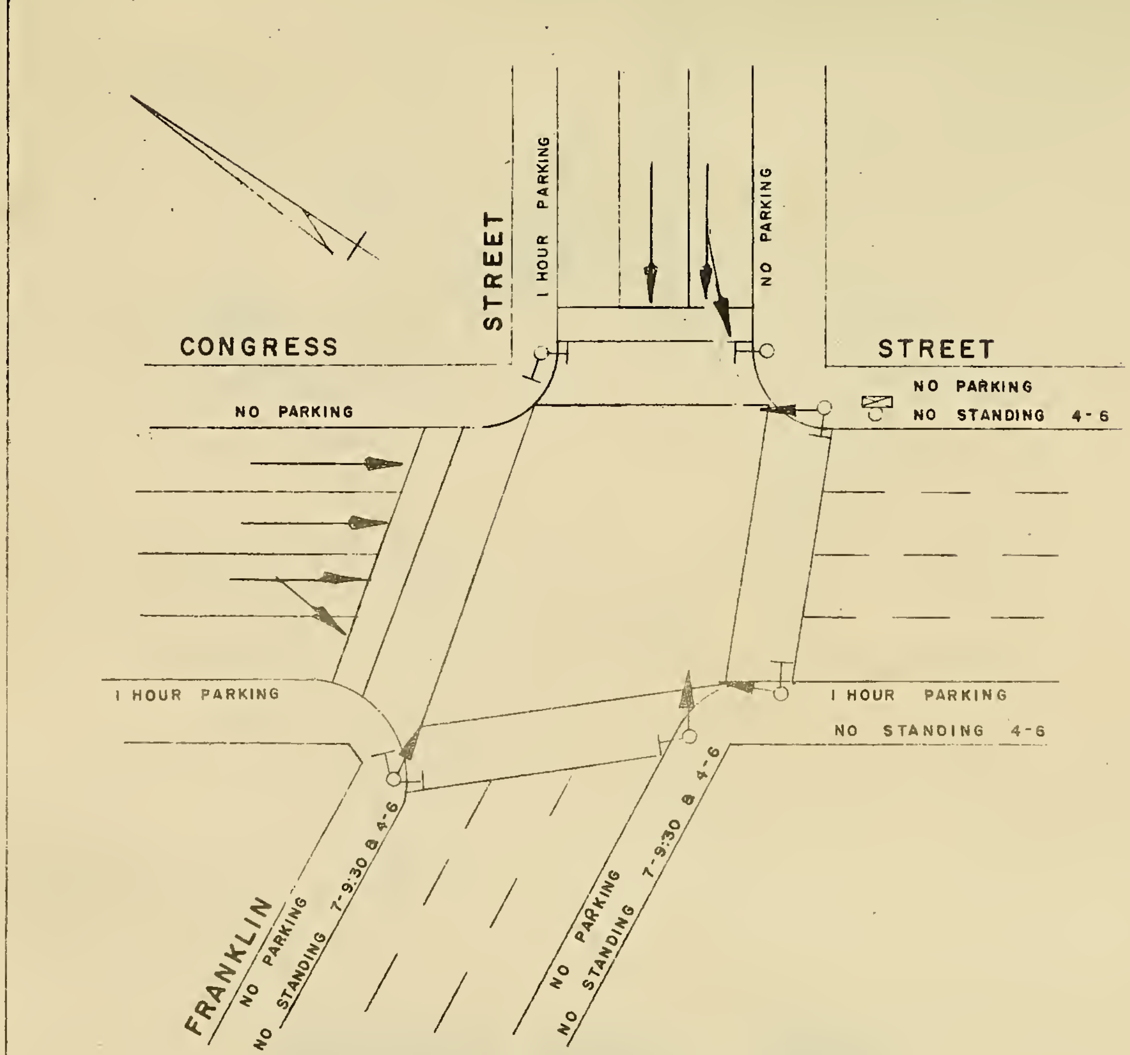
ACCIDENT SUMMARY

BOSTON TRAFFIC & PARKING DEPARTMENT

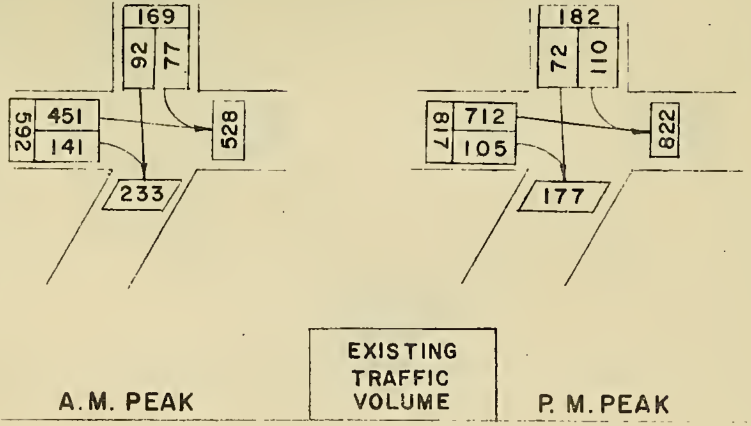
INTERSECTION OF
FEDERAL & FRANKLIN STS.

FINANCIAL DISTRICT
TOPICS IMPROVEMENT PROGRAM

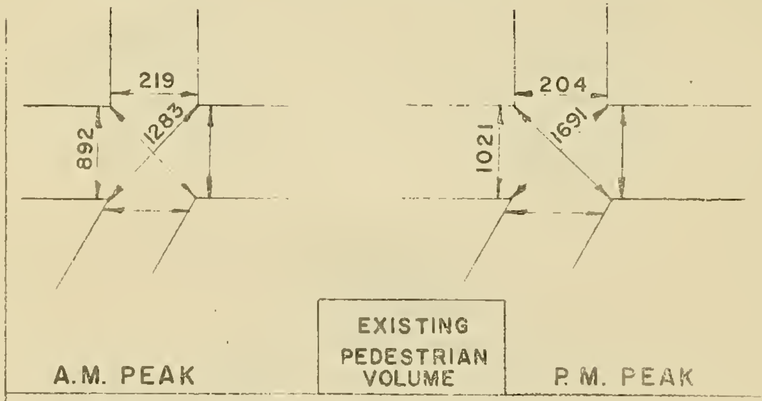
FIGURE 10



PROPOSED SIGNAL LAYOUT AND OPERATIONS PLANS



EXISTING TRAFFIC VOLUME



EXISTING PEDESTRIAN VOLUME

Number of Accidents Reported (65-69) - 20

Number of Injuries - 16

Number of Fatalities - 0

Direct Annual Accident Loss - $ 7080

ACCIDENT SUMMARY

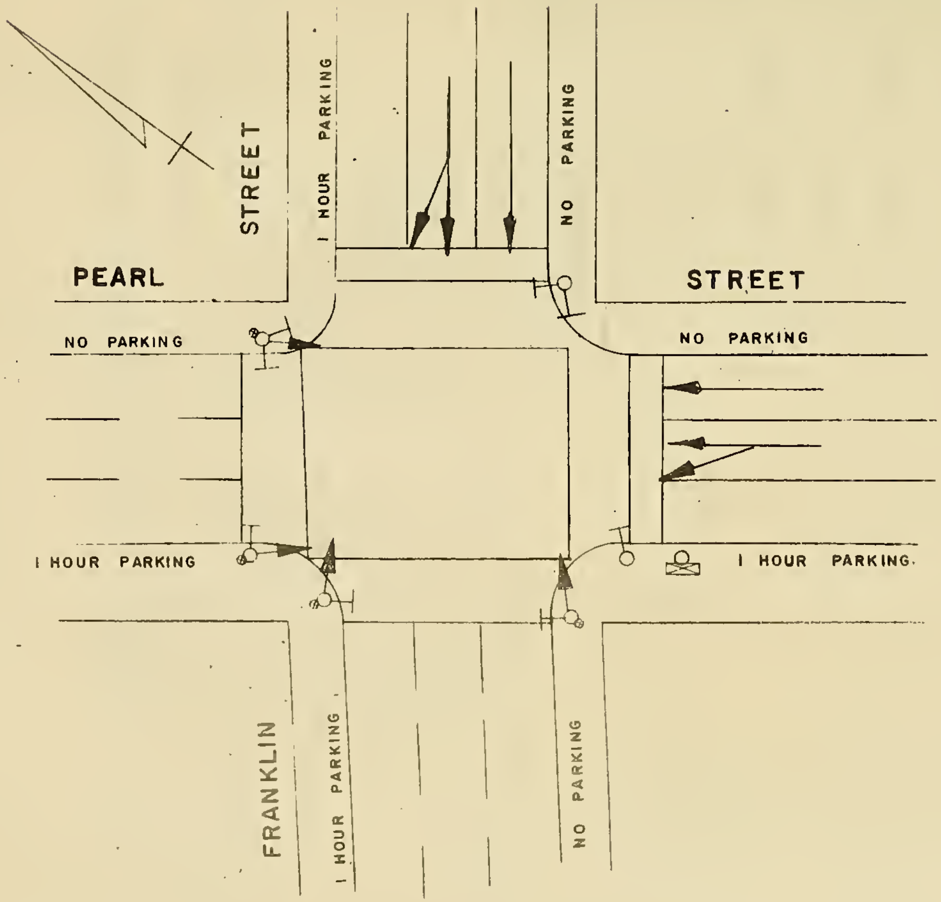
BOSTON TRAFFIC & PARKING DEPARTMENT

INTERSECTION OF

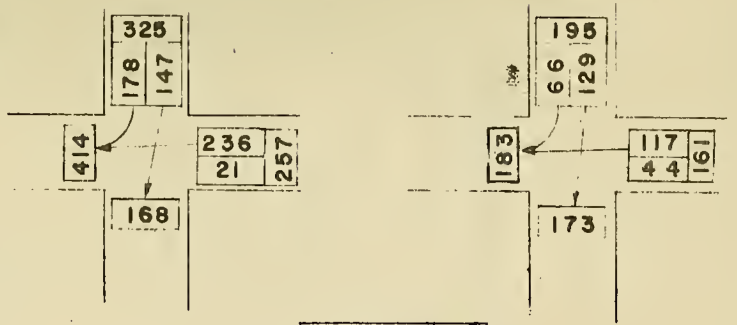
CONGRESS & FRANKLIN STS.

FINANCIAL DISTRICT
TOPICS IMPROVEMENT PROGRAM

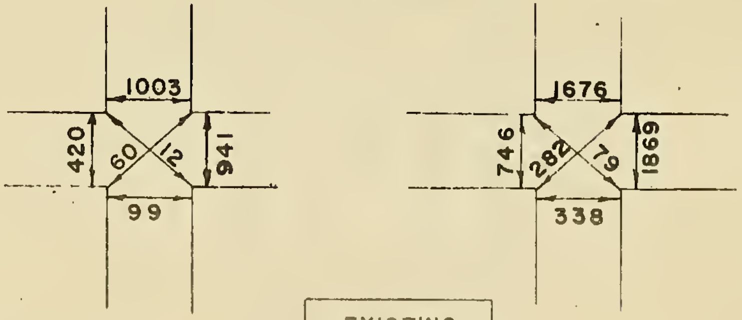
FIGURE 11



PROPOSED SIGNAL LAYOUT AND OPERATIONS PLANS



EXISTING TRAFFIC VOLUME



EXISTING PEDESTRIAN VOLUME

Number of Accidents Reported (65-69) - 4
Number of Injuries - 3
Number of Fotalities - 0
Direct Annual Accident Loss - 8 1750

ACCIDENT SUMMARY

BOSTON TRAFFIC & PARKING DEPARTMENT

INTERSECTION OF

FRANKLIN & PEARL STS.

FINANCIAL DISTRICT
TOPICS IMPROVEMENT PROGRAM

FIGURE 12

Franklin Street one-way west-bound meets Pearl Street one-way northbound with good alignment. This intersection presently carries relatively light vehicle traffic but is subjected to the heavy pedestrian movements which characterize most of these 14 intersections.

Signals are desirable for pedestrian safety and to maintain signal progression as part of the total system.

j. Intersection 10 - Pearl and High Streets (See Figure 13).

Vehicular volume (11 hours): 9,449

Pedestrian volume (6 hours): 6,480

Accidents reported (average per year) 1.2

Pearl Street, a main northbound avenue in the Financial District, is now two-way south of this intersection, but will be made one way as part of this program. High Street, a major thoroughfare is a major one-way arterial street.

This crossing carries moderately heavy vehicular traffic and sufficiently heavy pedestrian traffic conflicting with the major auto flow (High Street) to warrant signals.

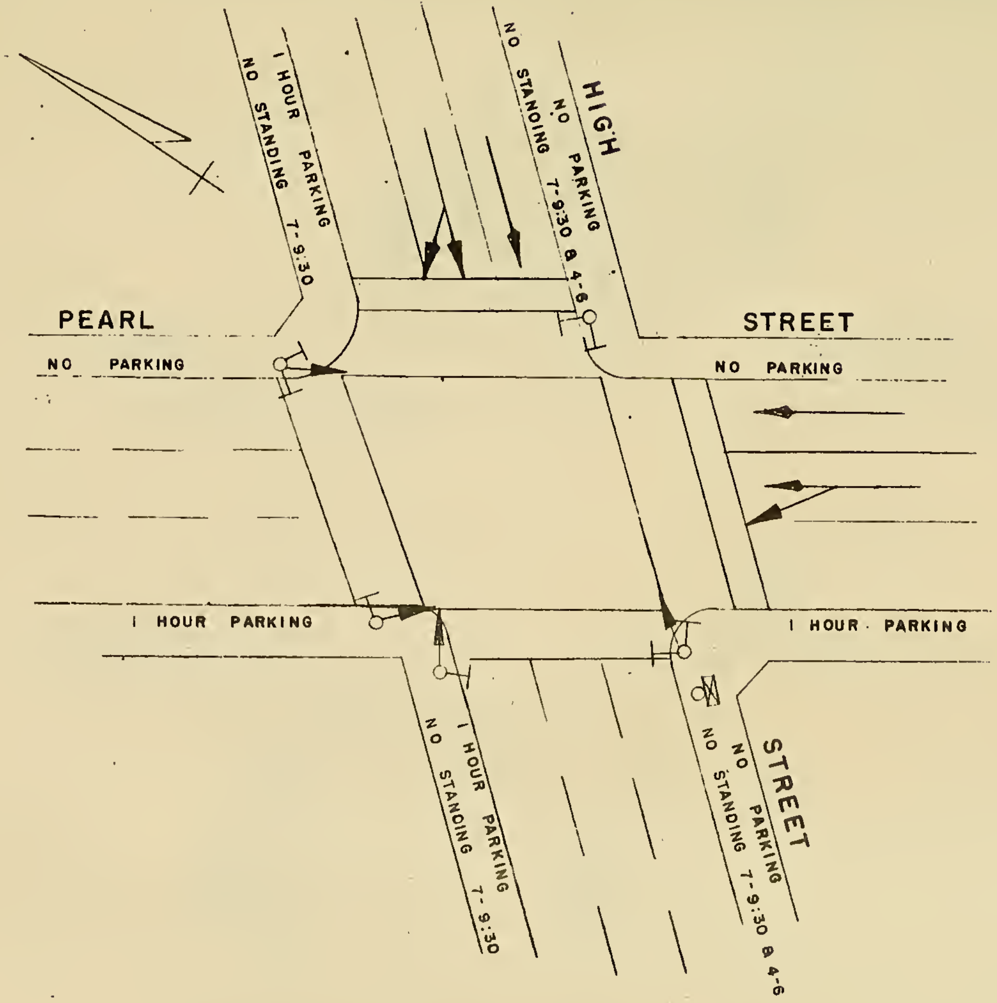
k. Intersection 11 - Congress and High Streets (See Figure 14).

Vehicular volume (11 hours): 12,831

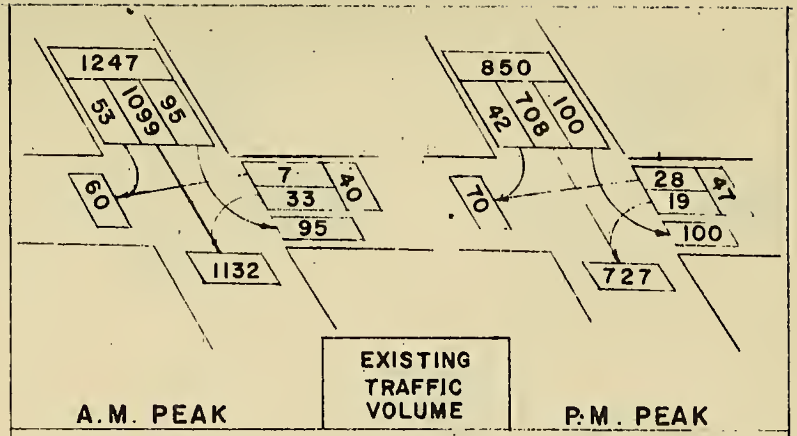
Pedestrian volume (6 hours): 6,902

Accidents reported (average per year): 7.8

Congress and High Streets, both being major traffic carriers, meet here with Congress one-way south-bound and High one-way west-bound. This intersection carries one of the highest vehicular volumes, a moderate



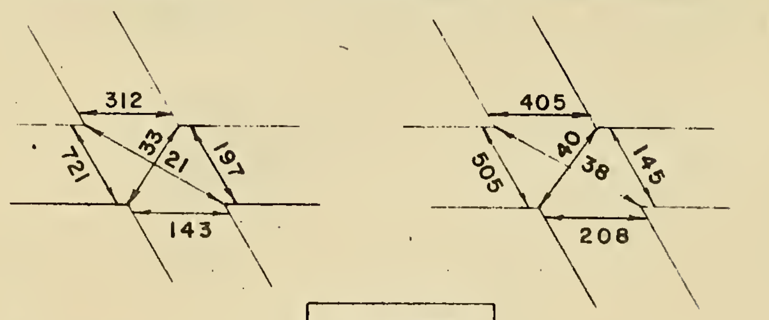
PROPOSED SIGNAL LAYOUT AND OPERATIONS PLANS



A.M. PEAK

EXISTING TRAFFIC VOLUME

P.M. PEAK



A.M. PEAK

EXISTING PEDESTRIAN VOLUME

P.M. PEAK

Number of Accidents Reported (65-69) - 5
Number of Injuries - 2
Number of Fatalities - 0
Direct Annual Accident Loss - $ 1300

ACCIDENT SUMMARY

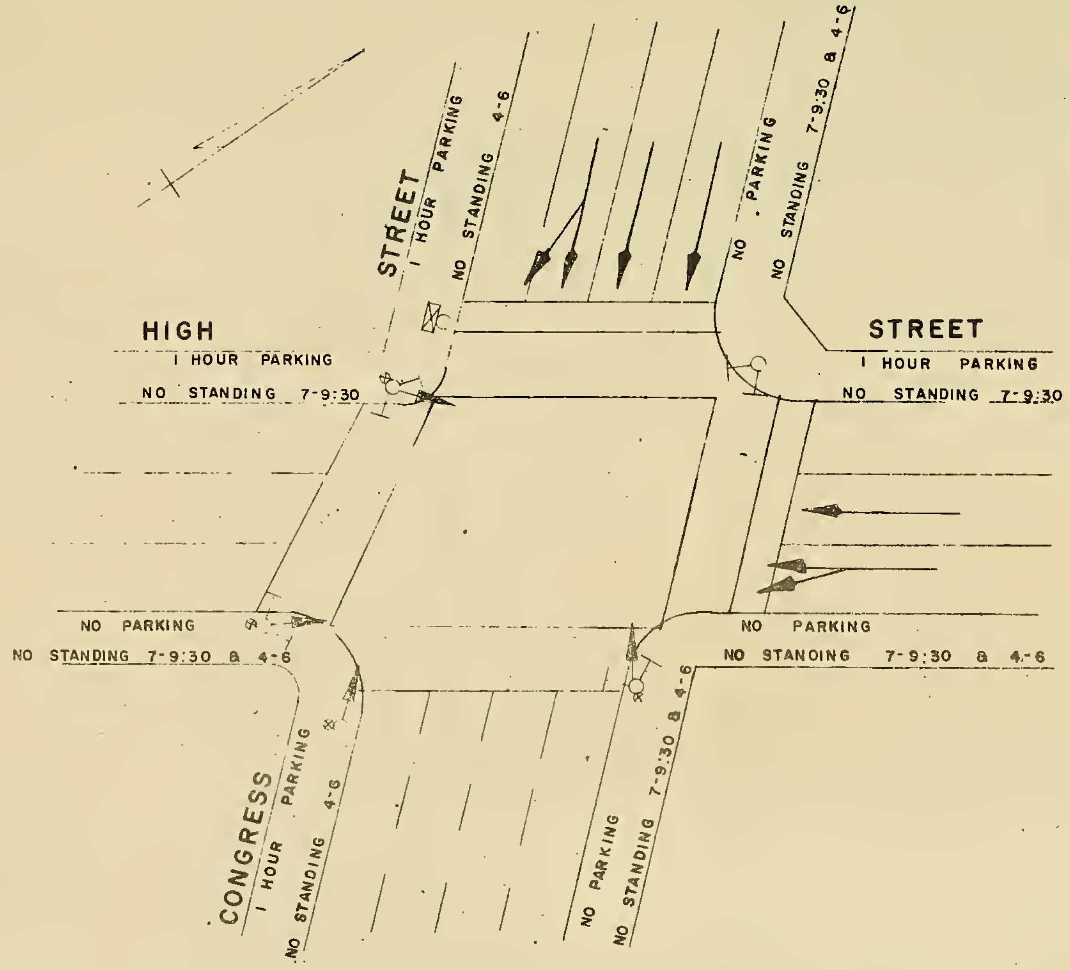
BOSTON TRAFFIC & PARKING DEPARTMENT

INTERSECTION OF

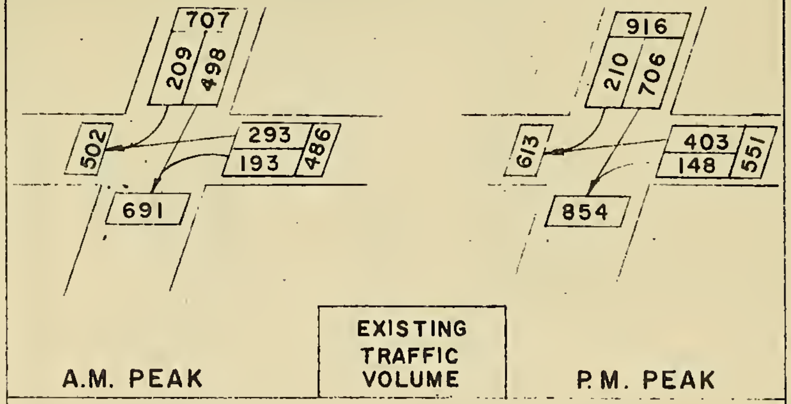
PEARL & HIGH STS.

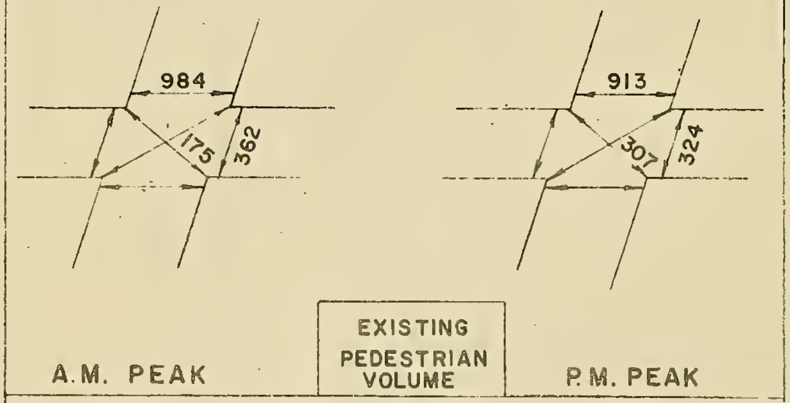
FINANCIAL DISTRICT
TOPICS IMPROVEMENT PROGRAM

FIGURE 13



PROPOSED SIGNAL LAYOUT AND OPERATIONS PLANS





Number of Accidents Reported (65-69)	- 39
Number of Injuries	- 13
Number of Fatalities	- 0
Direct Annual Accident Loss	- $7800

ACCIDENT SUMMARY

BOSTON TRAFFIC & PARKING DEPARTMENT

INTERSECTION OF

CONGRESS & HIGH STS.

FINANCIAL DISTRICT
TOPICS IMPROVEMENT PROGRAM

FIGURE 14

pedestrian load, and has the worst accident rate of the 14 areas under study.

Signals are warranted here on a combined basis of vehicles, pedestrians and accidents.

l. Intersection 12 - Federal and High Streets (See Figure 15).

Vehicular volume (11 hours): 10,783

Pedestrian volume (6 hours): 14,905

Accidents reported (average per year) 3.8

At this intersection, Federal Street is one-way north-bound, and High Street is one-way west-bound. These two streets support heavy volumes of both vehicles and pedestrians with a moderate accident rate.

Vehicular traffic here alone is sufficient to warrant signals. High Street is the major street of the two and Figure 15 shows the emphasis given to providing more lanes during peak hours by the new parking regulations.

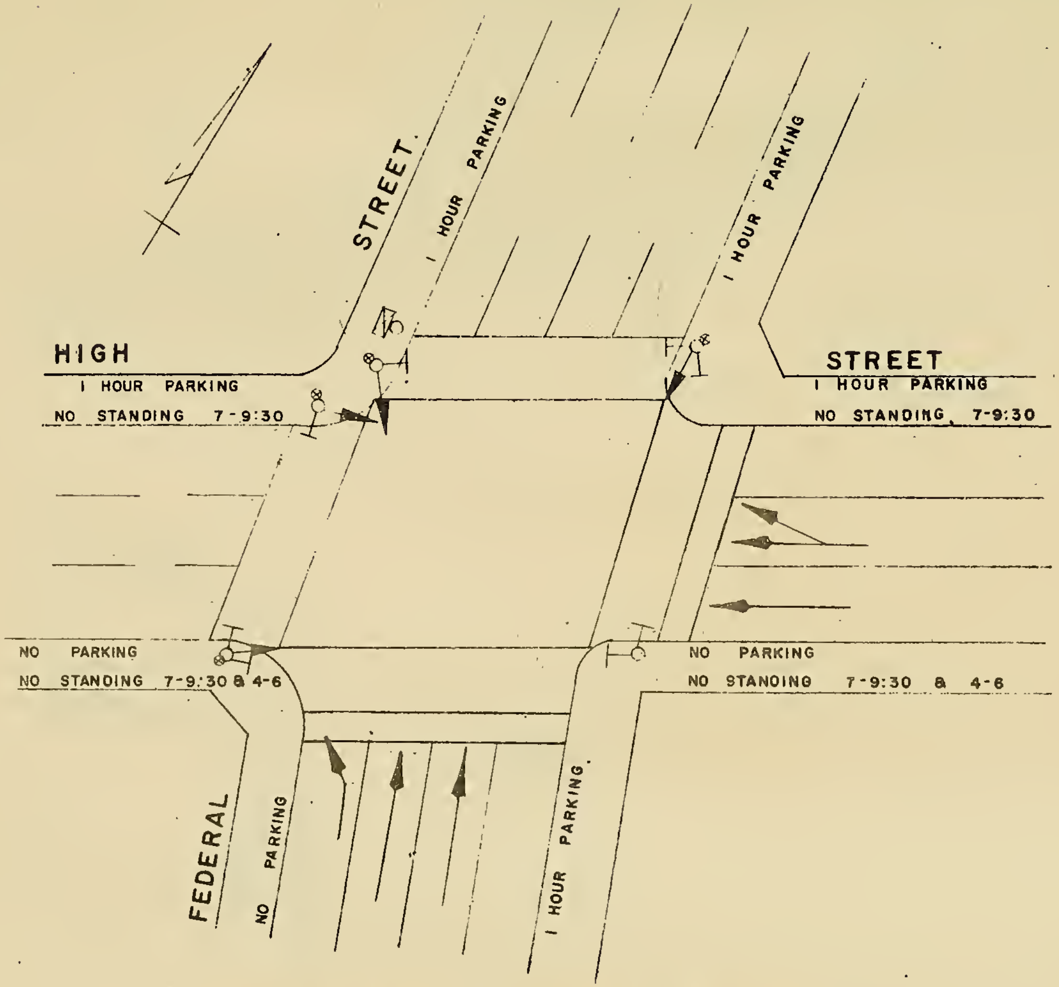
m. Intersection 13 - High, South and Summer Streets (See Figure 16).

Vehicular volume (11 hours): 9,703

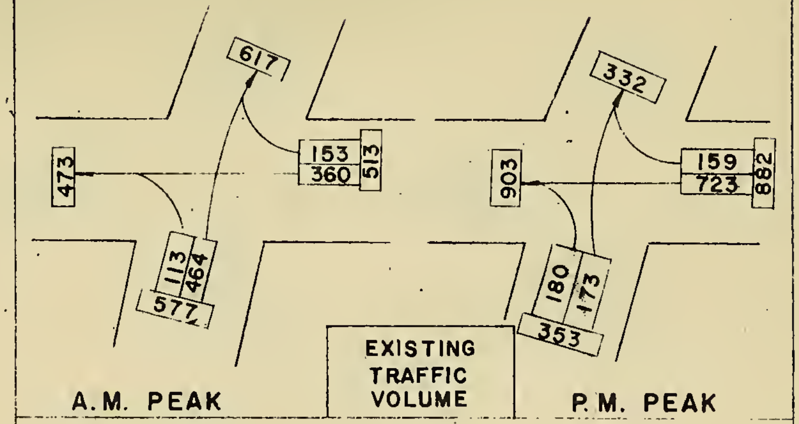
Pedestrian volume (6 hours): 7,360

Accidents reported (average per year) 1.6

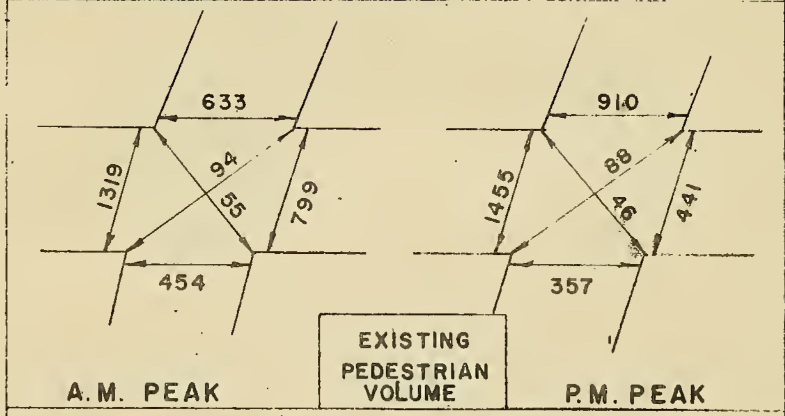
This unusual intersection has some alignment problems, due partly to geometry and partly to the combination of two-way and one-way legs. The High Street approach from the east is poorly aligned with South Street. Summer Street is two-way at Church Green and one-way east-bound on the east side of the intersection.



PROPOSED SIGNAL LAYOUT
AND
OPERATIONS PLANS



EXISTING TRAFFIC VOLUME



EXISTING PEDESTRIAN VOLUME

Number of Accidents Reported (65-69) - 15
Number of Injuries - 7
Number of Fatalities - 0
Direct Annual Accident Loss - $ 4650

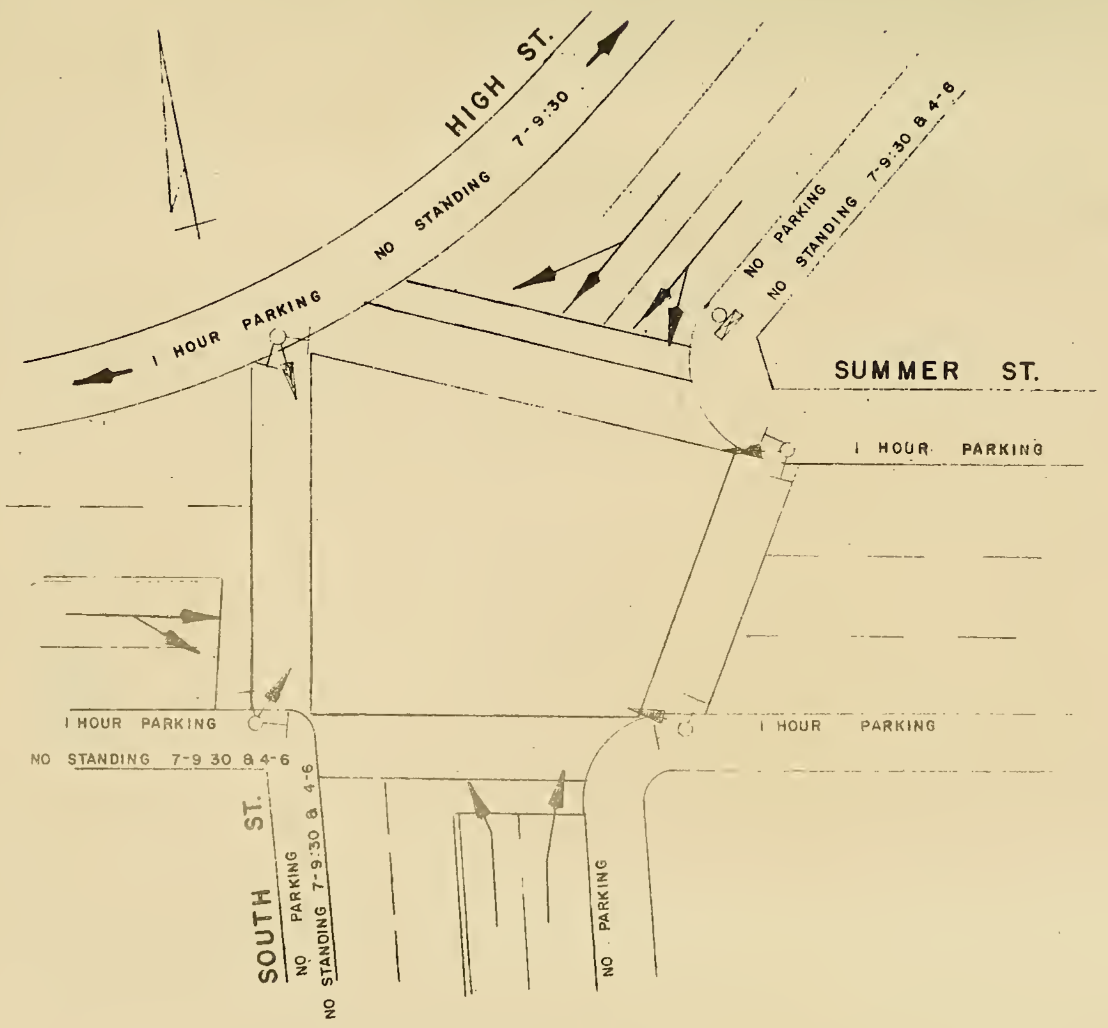
ACCIDENT SUMMARY

BOSTON TRAFFIC & PARKING DEPARTMENT

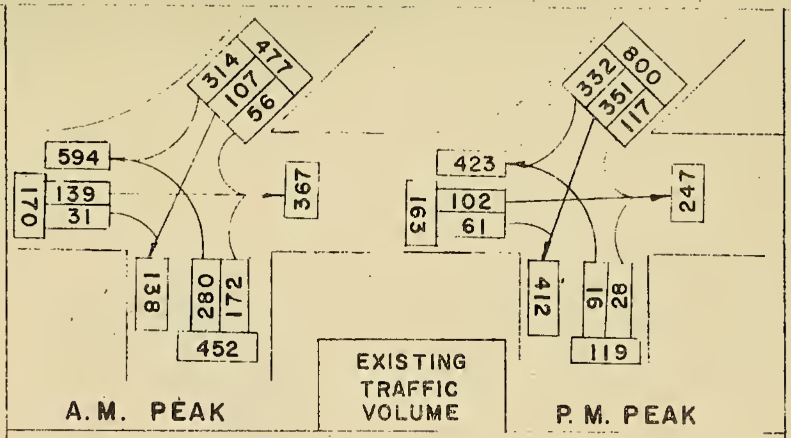
INTERSECTION OF
FEDERAL & HIGH STS.

FINANCIAL DISTRICT
TOPICS IMPROVEMENT PROGRAM

FIGURE 15



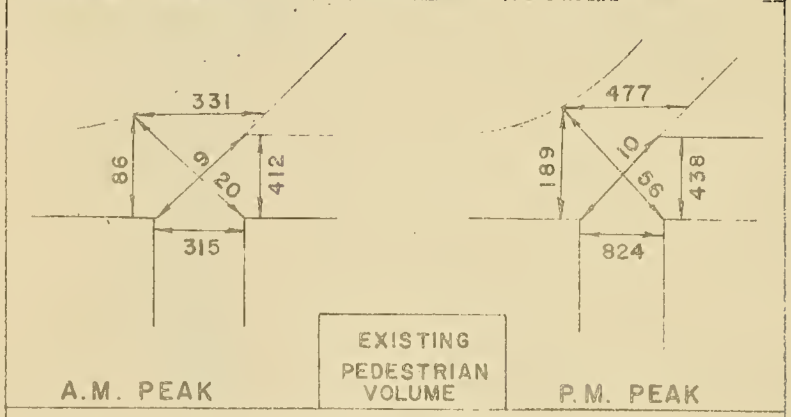
PROPOSED SIGNAL LAYOUT AND OPERATIONS PLANS



A.M. PEAK

EXISTING TRAFFIC VOLUME

P. M. PEAK



A.M. PEAK

EXISTING PEDESTRIAN VOLUME

P. M. PEAK

Number of Accidents Reported (65-69) - 8

Number of Injuries - 3

Number of Fatalities - 0

Direct Annual Accident Loss - $ 1720

ACCIDENT SUMMARY

BOSTON TRAFFIC & PARKING DEPARTMENT

INTERSECTION OF

HIGH, SOUTH & SUMMER STS.

FINANCIAL DISTRICT
TOPICS IMPROVEMENT PROGRAM

FIGURE 16

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An advanced TOPICS program;
The financial district.

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